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1991 HAMILTON-WENTWORTH COLLISION REPORT

PREPARED BY:
THE CITY OF HAMILTON TRAFFIC DEPARTMENT

URBAN MUNICIPAL

FEB 1993

GOVERNMENT DOCUMENTS

1991 Hamilton-Wentworth Collision Report

Prepared For:

The Transportation/Environmental Services Department
of the Regional Municipality of Hamilton-Wentworth

The Hamilton-Wentworth Regional Police Department

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ACKNOWLEDGEMENTS

The Project Staff of the Hamilton Traffic Department wish to express their appreciation to the members of the Transportation/Environmental Services and Planning Departments of the Regional Municipality of Hamilton-Wentworth, the Regional Police Department and the Ministry of Transportation of Ontario for their co-operation and assistance in the conduct of this study.

The Project Staff was comprised of Mr. Hart Solomon, P. Eng., Ms. L. Juchniewicz, Ms. J. MacLeod, Ms. D. Whiting, Mr. R. Galloway, Mr. H. Murray, Ms. W. Crevier and Ms. C. Alletto of the Traffic Department. The Department wishes to thank Ms. P. Kookla, Mr. A. Benson and Mr. N. Cooper of the Information Systems Department and Mr. R. Salmon and the staff of the Services Division of the City Clerk's Department for their assistance in the preparation of this report.

1991 HAMILTON-WENTWORTH MOTOR VEHICLE COLLISION REPORT

Introduction

This annual report is a summary of factors associated with traffic collisions that occurred in the Regional Municipality of Hamilton-Wentworth in 1991.

The Regional Municipality of Hamilton-Wentworth is situated in southern Ontario, at the westerly end of Lake Ontario. The following Municipalities are located within the Region: The Town of Ancaster, The Town of Dundas, The Township of Flamborough, The Township of Glanbrook, The City of Hamilton and the City of Stoney Creek. The projected total population of these combined localities was 436,546 in 1991 (based on 1988 population data).

Traffic collisions are a primary cause of accidental deaths, injuries and associated property losses. The intention of this report is to provide factual information to those agencies and persons concerned with the safety of the roadway transportation system within the Regional Municipality of Hamilton-Wentworth.

Traffic collisions frequently involve complex interactions between human behaviour, vehicle characteristics, and environmental conditions. The factor or factors responsible for causing a collision are not always the most obvious nor are they always readily apparent. Caution should be exercised in drawing conclusions from the statistics presented in this report and conclusions should be drawn only with appropriate qualifications and supportive information.

The information presented in this report is based primarily upon motor vehicle collisions investigated by the Hamilton-Wentworth Regional Police. Information about collisions recorded by other police forces, (such as the Ontario Provincial Police) has not been included. This generally excludes collisions occurring on King's Highways (including the Queen Elizabeth Way, Highway 403 and Highways 2, 6, 8, 20, 53 and 56) that pass through the Region.

EXECUTIVE SUMMARY

* In 1991, 6,145 reported traffic collisions occurred on municipal roadways in the Regional Municipality of Hamilton-Wentworth. These collisions resulted in:

- 15 driver or passenger fatalities (10 motor vehicle drivers, 3 cyclists and 2 riders/passengers)
- 10 pedestrian fatalities
- 3,105 driver, cyclist or passenger injuries
- 340 pedestrian injuries
- 17,765 persons (equal to approximately 5 percent of the Regional population) being involved in a reported traffic collision

* The overall frequency of collisions in Hamilton-Wentworth is generally lower than other major Canadian municipalities.

* The frequency rate of fatalities in the City of Hamilton is generally lower than other Canadian and U.S. cities of similar population.

* The period from 1 a.m. to 5 a.m. exhibits the highest ratio of collisions to vehicle volume using the street system.

* Drivers under the age of 24 years were involved in a disproportionate number of collisions relative to the age distribution of the licensed driving population of Ontario.

* The predominant improper driver action indicated in collisions was "failed to yield right-of-way".

* 6.3 percent of reported collisions involved one or more drivers who had been drinking.

* Most collisions involving alcohol occurred in the evening from 4 p.m. to 3 a.m. These figures are indicative of alcohol being present in the bloodstream of one or more of the drivers involved in the collision and do not necessarily mean that alcohol was the proximate cause of the collision.

* Pedestrians between the ages of 5 and 19 years of age were involved in a disproportionate number of collisions based on the age distribution of the population of Hamilton-Wentworth. Pedestrians in this age group were most frequently involved in a collision as the result of entering the roadway unexpectedly from behind a parked vehicle or object.

1991 COMPARED WITH PREVIOUS YEARS

1. Overall Collisions

Seven hundred and seventy-two fewer collisions occurred in 1991 than in 1990. Consistent with this decrease in collisions, the occurrence of injury collisions was substantially lower than 1990. The number of recorded collisions in 1991 is the lowest since 1961 and the number of injury collision is the lowest since 1963.

2. Bicycle Injuries

The number of people injured in motor vehicle collisions while riding on a bicycle has remained relatively constant for the years 1988 to 1991. However, when 1990 and 1991 are compared to past years (1982 - 1989), the number of cyclists injured appears to be declining slightly.

3. Pedestrian Collisions Involving Five to Nine Year Olds

Collisions involving five to nine year old pedestrians remained constant with 54, 53, and 49 collisions occurring in the years 1989, 1990, 1991 respectively. For comparison, data for the years 1980 through 1983 were 90 collisions, 72 collisions, 107 collisions and 79 collisions respectively. In 1988 there were 75 collisions. Although data for the years 1984 to 1987 is not available, it would appear that the number of collisions involving five to nine year olds is declining.

4. Alcohol Involvement

Alcohol involvement in motor vehicle collisions has been, on average, steadily decreasing since 1978. In the years 1988 to present, alcohol involvement in collisions averaged 6.1 percent, compared to 10.3 percent for the previous 12 years.

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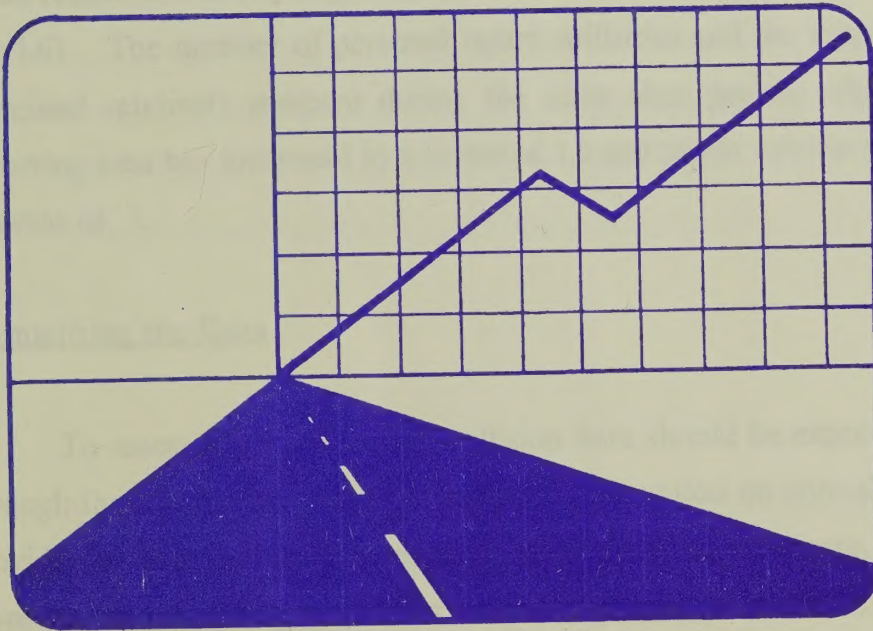
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Chapter One

Trends



Chapter One

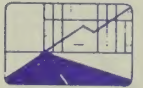
Trends

Chapter One

Trends



Trends Chapter One



Chapter 1

General

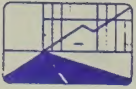
Since peaking around 1977 the overall number of motor vehicle collisions, the number of fatal collisions and the number of pedestrians injured in motor vehicle collisions in the Regional Municipality of Hamilton-Wentworth has been steadily decreasing (Exhibits 1.4, 1.6). The number of personal injury collisions and the number of cyclist injuries has remained relatively constant during the same time period, while the population of the reporting area has increased by a factor of 1.6 and motor vehicle registrations have risen by a factor of 3.

Normalizing the Data

To assess historical trends, collision data should be expressed as a normalized rate through the use of one of several factors. Information on annual motor vehicle use would provide the most accurate assessment of a motorist's exposure, and hence, likelihood of involvement in a collision. Motor vehicle registration data is somewhat less accurate as a normalizing factor, but is utilized since exposure information is not available. Population also provides a suitable and accurate normalizing factor. Exhibits 1.1, 1.2, 1.3 and associated analysis in this chapter refer to data which has been calculated on a population *rate* basis (based on 1988 population data).

Collisions

The overall motor vehicle collision rate is shown in Exhibit 1.1. As of January 1, 1978, the reporting level for property damage only collisions was raised from \$200.00 to \$400.00. In January 1, 1985, it was raised again from \$400.00 to \$700.00. Due to these changes, trend analysis cannot be conducted on property damage collisions (Exhibit 1.4). The rate for total collisions appears to show a decline from 1965 to 1991. However, due to the changes in the reporting criteria and reporting area (this reporting area increased in



1974) for the period for which historical data are available, trend analysis on the number of collisions would not be appropriate or meaningful.

The rate of collisions involving injury or fatality shows a modest decline from 1973 to 1991. Individual trends of injuries and fatalities are discussed below.

Injuries

The rate of personal injury (Exhibits 1.2, 1.5) is rather volatile. This volatility is likely related to the nature and severity of the collisions which could be the result of a number of factors. The rate for pedestrian injuries (Exhibits 1.3, 1.6) shows a significant decline from 1966 to 1991.

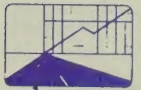
Fatalities

In 1991, twenty-five persons died in motor vehicle collisions in Hamilton-Wentworth. Since fatal collisions are rare events, small changes in the number of fatalities cause large fluctuations in the fatality rate (Exhibit 1.2, 1.4). These fluctuations reduce the validity of statistical tests. Thus while the fatality rate for personal fatalities shows a slight downward trend, especially since 1978, this trend is not statistically significant.

The fatality rate for pedestrians (Exhibit 1.3, 1.6) does display a significant reduction, especially since 1978.

Alcohol Involvement

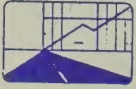
When viewed as a proportion of overall collisions, alcohol involvement (Exhibit 1.7) has been, on average, steadily decreasing since 1978. In the years 1988 to 1991 collision involvement remained relatively constant with an average of 6.1 percent which is 4.2 percent lower than the previous 12 year average of 10.3 percent. The percentage of total fatal collisions that were alcohol related has been generally decreasing since 1984. 14 percent of all fatal collisions since 1984 have been alcohol related, with the average for the past



fifteen years being 19 percent. The percentage of impaired/had been drinking drivers under the age of 21 has steadily been declining since 1979, with the exception of 1986. These figures indicate that, in recent years, alcohol involvement in collisions is declining.

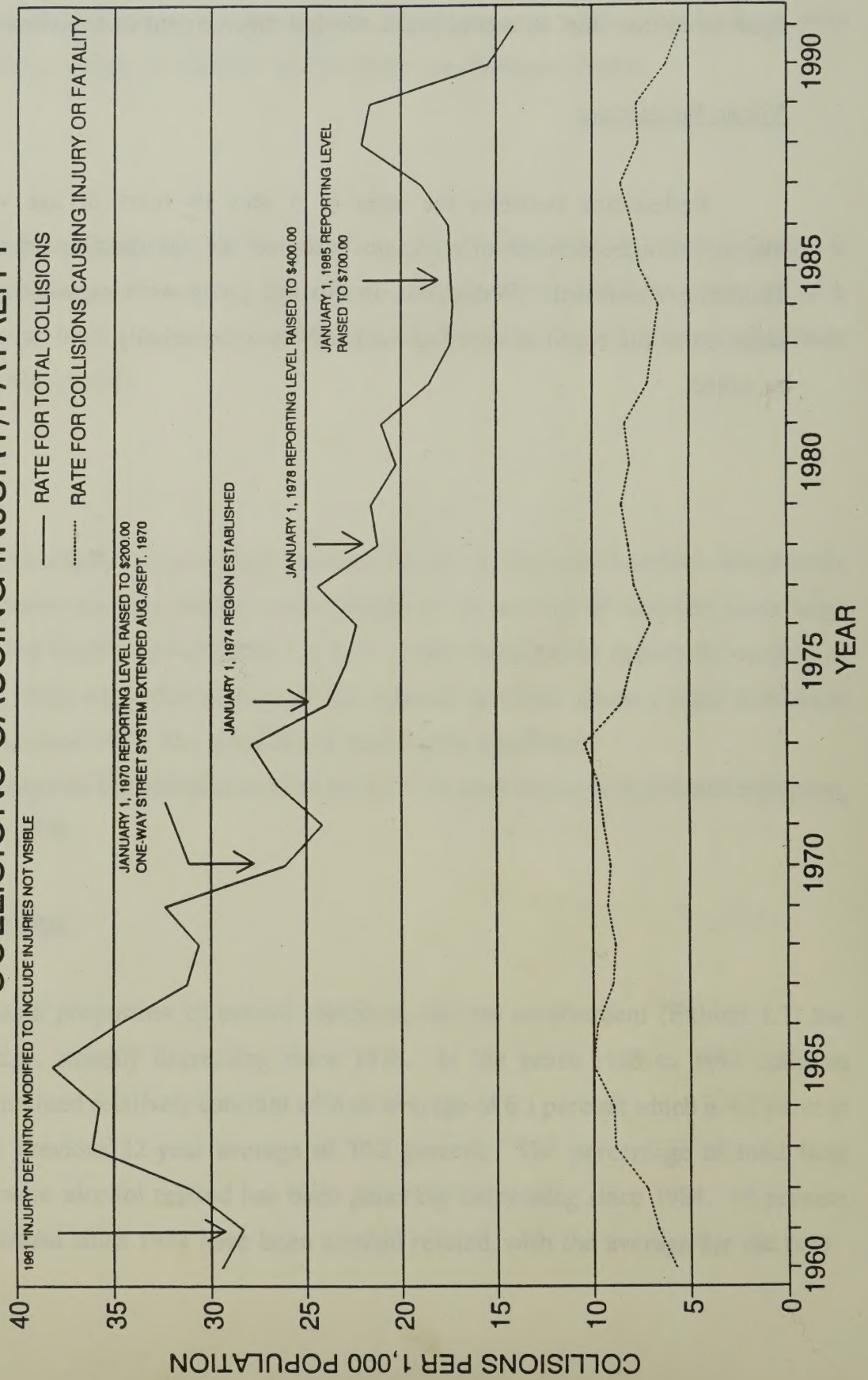
Young Pedestrians

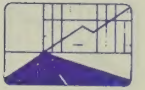
Pedestrians between the ages of 5 and 19 years of age were involved in a disproportionate number of collisions based on the age distribution of the population of Hamilton-Wentworth. Pedestrians in this age group were most frequently involved in a collision as the result of entering the roadway unexpectedly from behind a parked vehicle or object.



MOTOR VEHICLE COLLISIONS: HISTORY OF RATES OF TOTAL COLLISIONS & COLLISIONS CAUSING INJURY/FATALITY

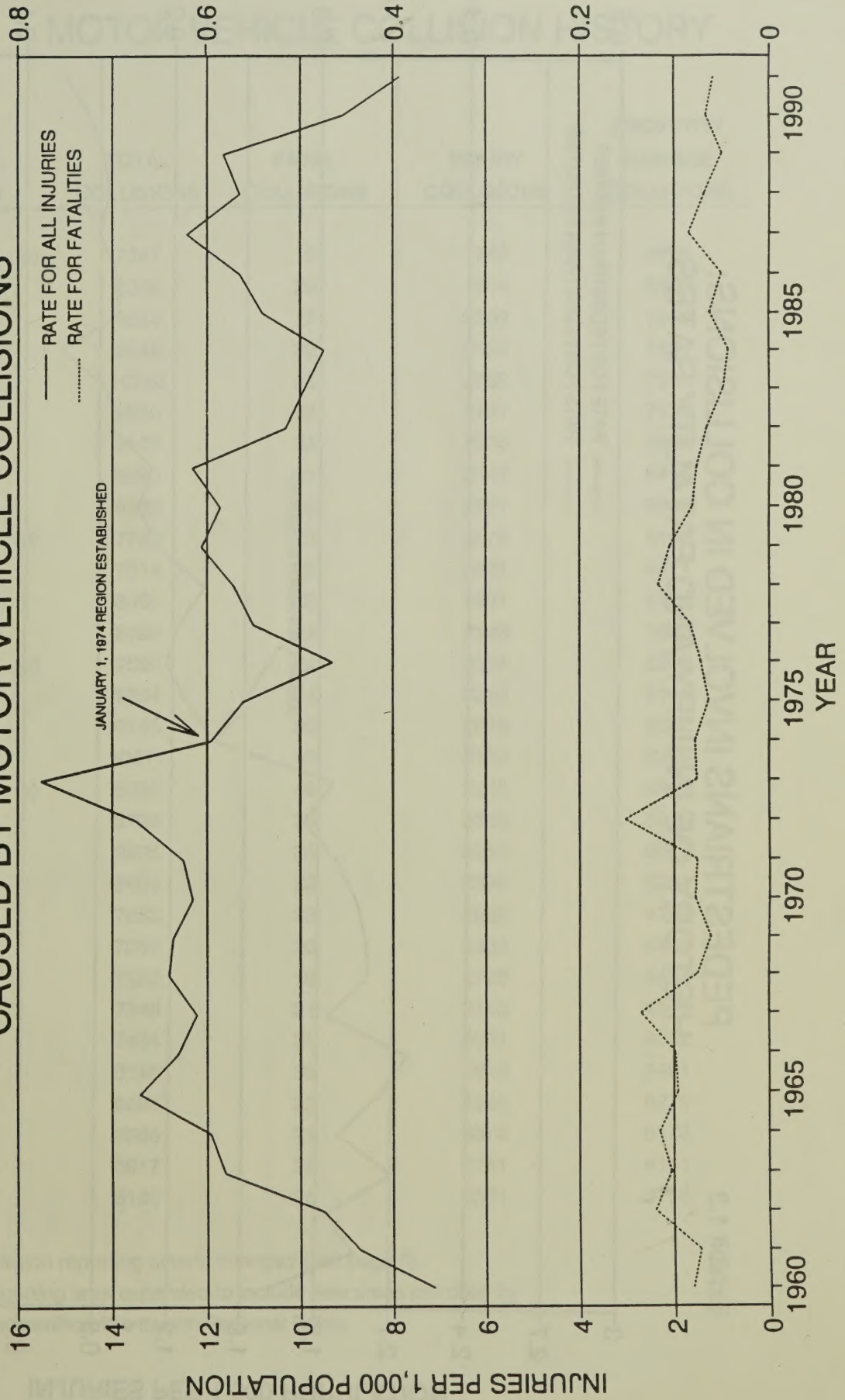
Exhibit 1.1





PERSONAL INJURIES/FATALITIES: HISTORY OF INJURY AND FATALITY RATES CAUSED BY MOTOR VEHICLE COLLISIONS

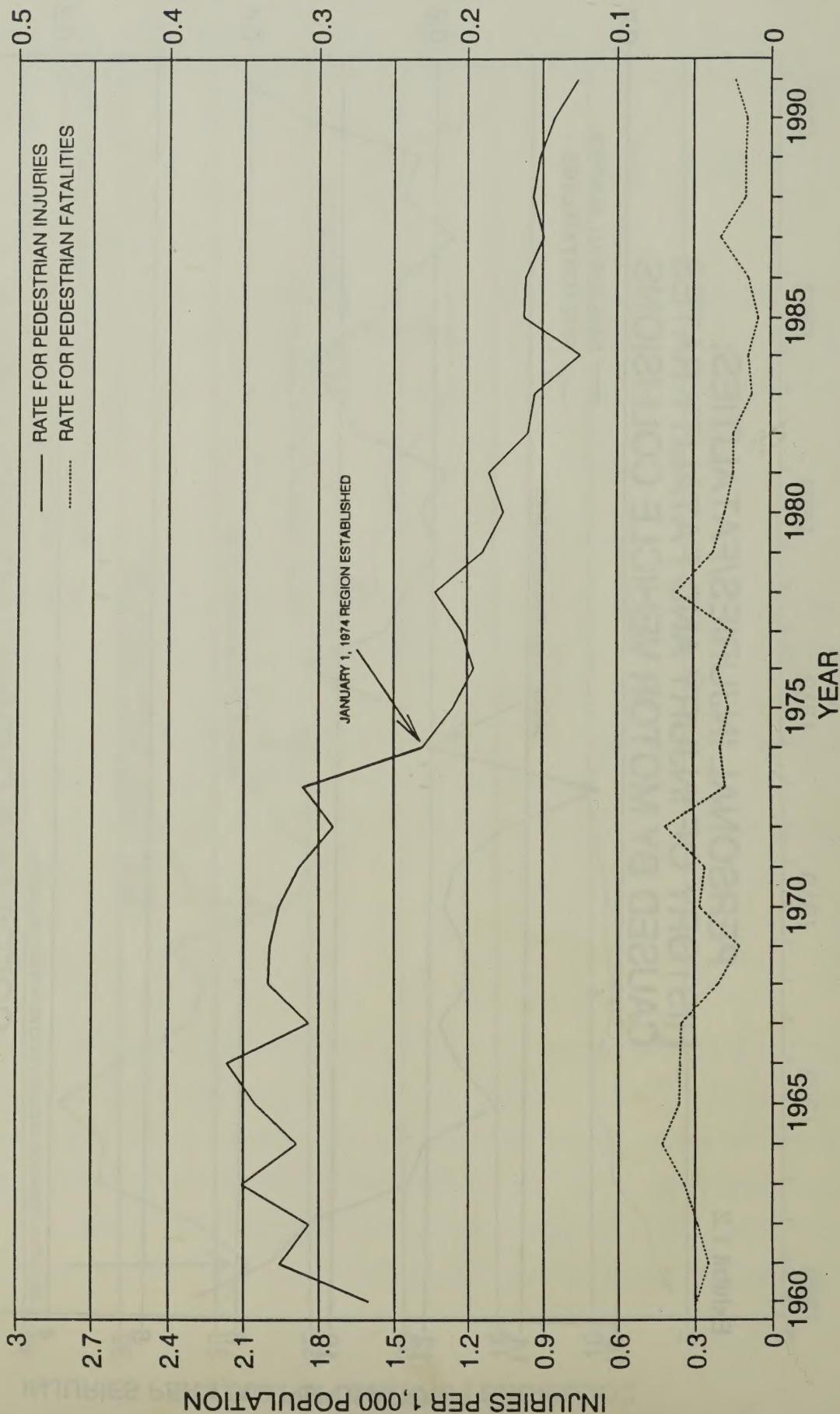
Exhibit 1.2





PEDESTRIANS INVOLVED IN COLLISIONS: HISTORY OF INJURY AND FATALITY RATES

Exhibit 1.3



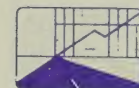


Exhibit 1.4

MOTOR VEHICLE COLLISION HISTORY

YEAR	TOTAL COLLISIONS	FATAL COLLISIONS	INJURY COLLISIONS	PROPERTY DAMAGE COLLISIONS
1961 (a)	7547	18	1744	5785
1962	8338	28	1904	6406
1963	9554	27	2309	7218
1964	9948	32	2455	7461
1965	10783	26	2789	7968
1966	9950	27	2757	7166
1967	9106	35	2575	6496
1968	8983	21	2547	6415
1969	9589	19	2721	6849
1970 (a)	7799	23	2676	5100
1971	7314	22	2821	4471
1972	8065	39	2901	5125
1973	8499	23	3143	5333
1974 (b)	9599	29	3364	6206
1975	9354	24	3219	6111
1976	9146	28	2816	6302
1977	10011	33	3182	6796
1978 (a)	8636	45	3246	5345
1979	8798	39	3389	5370
1980	9305	33	3253	5019
1981	8660	28	3398	5234
1982	7663	23	2939	4701
1983	7268	20	2839	4409
1984	7228	18	2726	4484
1985	7346	21	3153	4172
1986	7434	21	3331	4082
1987	8140	35	3615	4491
1988	9586	22	3285	6279
1989	9566	21	3372	6173
1990	6917	25	2751	4141
1991	6145	25	2331	3789

(a) Collision reporting criteria changed (see page 3).

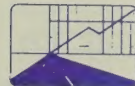
(b) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.



Exhibit 1.5

HISTORY OF PERSONAL INJURIES AND FATALITIES CAUSED BY MOTOR VEHICLE COLLISIONS

YEAR	TOTAL COLLISIONS	PERSONS INJURED	PERSONAL		NUMBER OF FATALITIES	FATALITIES/	
			INJURIES/1,000 POPULATION	POPULATION		100,000 POPULATION	10,000 REGISTERED VEHICLES
1961 (a)	7547	2311	8.7		19	7.1	2.22
1962	8338	2542	9.5		32	11.9	3.82
1963	9554	3075	11.6		27	10.2	3.03
1964	9948	3305	11.9		32	11.5	3.43
1965	10783	3824	13.4		27	9.5	2.64
1966	9950	3746	12.6		28	9.8	2.60
1967	9106	3484	12.2		39	13.7	3.63
1968	8983	3573	12.8		22	7.9	1.89
1969	9589	3768	12.7		19	6.4	1.64
1970 (a)	7799	3717	12.3		23	7.5	2.00
1971	7314	3876	12.5		23	7.0	1.91
1972	8065	4055	13.5		46	15.3	3.42 (b)
1973	8499	4951	15.5		23	7.2	1.63
1974 (c)	9599	4678	11.9		31	7.9	2.00 (b)
1975	9354	4474	11.2		26	6.5	1.60 (b)
1976	9146	3811	9.3		29	7.1	1.78 (b)
1977	10011	4513	11.0		34	8.3	2.00 (b)
1978 (a)	8636	4635	11.4		47	11.6	2.06 (d)
1979	8798	4923	12.1		42	10.3	2.20 (d)
1980	8305	4800	11.7		33	8	1.43 (d)
1981	8660	5015	12.3		31	7.6	1.12 (d)



1982	7663	4175	10.3	27	6.6	0.91
1983	7268	4041	9.9	20	4.9	1.05 (e)
1984	7228	3855	9.5	18	3.8	0.83 (e)
1985	7346	4529	10.8	26	6.2	1.16 (e)
1986	7434	4758	11.3	21	5	0.90 (e)
1987	8140	5220	12.4	36	8.4	1.50 (e)
1988	9586	4898	11.4	29	6.8	1.17 (e)
1989	9566	5145	11.9	22	5.1	0.87 (e)
1990	6917	4053	9.4	30	6.9	1.18 (e)
1991	6145	3420	7.8	25	5.7	0.96 (d)

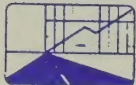
(a) Collision reporting criteria changed (see page 3).

(b) Registration estimated from total Ontario registrations.

(c) Reporting area expanded to include new areas patrolled by the Hamilton-Wentworth Regional Police.

(d) Registration data from licence information.

(e) Registration data from licence information for Wentworth County.



1991 Hamilton-Wentworth Collision Report
Exhibit 1.6

HISTORY OF PEDESTRIAN AND CYCLIST INJURIES AND FATALITIES

YEAR	COLLISIONS INVOLVING PEDESTRIANS	PEDESTRIANS INJURED	PEDESTRIAN FATALITIES	COLLISIONS INVOLVING CYCLISTS	CYCLISTS INJURED	CYCLIST FATALITIES
	(c)	(a)		(c)	(a)	
1961		522	11		112	1
1962		495	13		126	1
1963		558	15		120	1
1964		526	20		120	0
1965		582	17		140	0
1966		618	17		132	1
1967		537	17		113	0
1968		588	10		84	1
1969		602	6		91	2
1970		586	14		101	1
1971		570	13		155	2
1972		530	21		156	2
1973		569	9		197	1
1974 (b)		555	13		192	3
1975		513	11		235	0
1976		480	14		195	0
1977		503	10		193	3
1978		542	25		162	1
1979		464	15		177	4
1980		434	12		178	1
1981		458	10		159	1
1982		396	10		252	2
1983		387	5		200	2
1984		314	6		175	1
1985		410	3		239	2
1986	384	412	6	229	228	2
1987	379	383	14	244	244	2
1988	401	406	7	239	225	0
1989	411	403	7	164	154	3
1990	381	383	7	208	195	0
1991	332	330	10	193	185	3

(a) One or more pedestrian\cyclist could be involved and a fatality\injury may not have occurred.

(b) Prior to this year, reporting was for the City of Hamilton only.

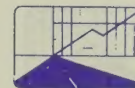
(c) This information was not available until 1986.

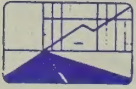
Exhibit 1.7

HISTORY OF ALCOHOL-RELATED MOTOR VEHICLE COLLISIONS

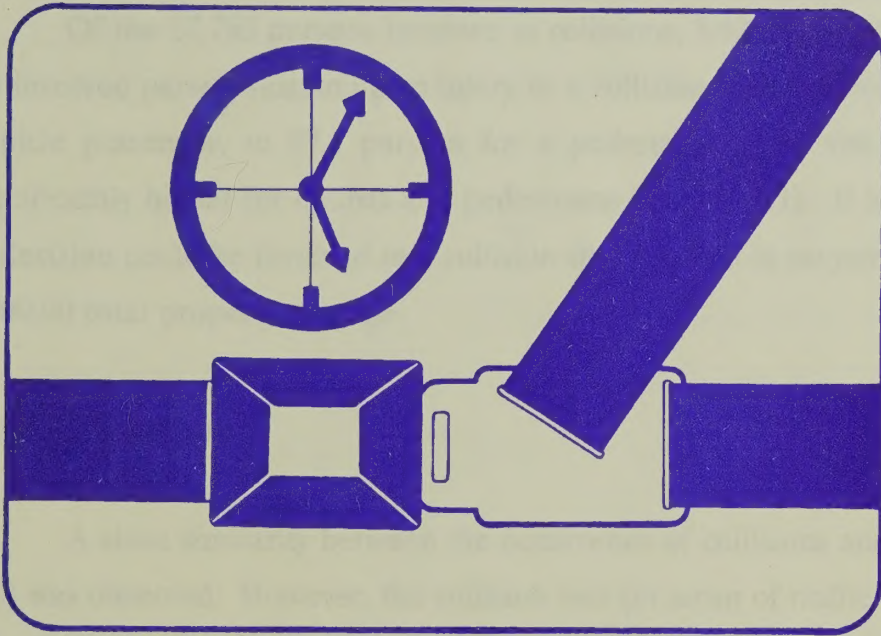
YEAR	TOTAL REPORTED COLLISIONS	TOTAL ALCOHOL- RELATED COLLISIONS (a)	PERCENTAGE OF TOTAL COLLISIONS INVOLVING ALCOHOL	% IMPAIRED OR HAD BEEN DRINKING DRIVERS UNDER THE AGE OF 21	TOTAL FATAL COLLISIONS	ALCOHOL- RELATED FATAL COLLISIONS (a)	% FATAL COLLISIONS HAVING ALCOHOL INVOLVED
1977	10011	1175	11.7	20.4	33	5	15.2
1978	8636	1128	13.1	22.1	45	11	24.4
1979	8798	1139	12.9	22.1	39	5	12.8
1980	8305	929	11.2	18.7	33	11	33.3
1981	8660	1053	12.2	16.4	28	8	28.6
1982	7663	895	11.7	19.0	23	3	13.0
1983	7268	765	10.5	18.6	20	5	25.0
1984	7228	729	10.1	15.0	18	5	27.8
1985	7346	644	8.8	12.7	21	5	23.8
1986	7434	596	8.0	20.5	21	4	19.0
1987	8140	589	7.2	11.9	35	5	14.3
1988	9586	582	6.1	9.9	22	2	9.1
1989	9566	542	5.7	6.7	21	6	28.6
1990	6917	430	6.2	6.6	25	4	16.0
1991	6145	385	6.3	7.6	25	3	12.0

(a) Includes drivers classified as impaired due to alcohol or classified as having been drinking (refer to Exhibit 3.5 for a more detailed description of categories).





1991 Hamilton-Wentworth Collision Report



Chapter Two

Selected Characteristics



Chapter Two Selected Characteristics



Chapter 2

Injuries

Of the 17,765 persons involved in collisions, 3,420 received injuries. The chance of an involved person sustaining an injury in a collision varied from 16.5 percent for a motor vehicle passenger, to 97.1 percent for a pedestrian. The risk of injury appears to be significantly higher for cyclists and pedestrians (Exhibit 2.1). It is unlikely that a cyclist or pedestrian could be involved in a collision that resulted in no personal injury and less than \$700.00 total property damage.

Time of Occurrence

A close similarity between the occurrence of collisions and traffic volumes (Exhibit 2.2) was observed. However, the collision rate (in terms of traffic volume) was greater than the daily average during the period from 1 a.m. to 5 a.m., when 355 or 5.8 percent of all collisions occurred. This may be due to driver conditions such as fatigue or alcohol impairment (refer to Exhibit 3.4 which shows that most collisions involving alcohol occurred in the evening).

The pattern of collision occurrences by time of day and day of week was summarized, and the differences found in the pattern of collision occurrence reflected traffic volumes. The highest number of collisions occurred between the hours of 4 p.m. to 5 p.m. (Exhibit 2.3) with the highest percentage of collisions occurring on Fridays (Exhibit 2.4).

The pattern of collision occurrences was compared on a month of year basis (Exhibit 2.5) and there was a difference in the number of collisions which occurred each month. The higher number of collisions occurred during the winter months which may be due to drivers not adjusting to adverse weather and roadway conditions.



Impact Type

The type of initial impact was compared with the injury classification of the collisions (Exhibit 2.6). The probability of an injury or fatality resulting from a collision was highest in "head on" (51.9%) and "pedestrian/vehicle" (98.8%) collision types. However, these collision types only make up 7 percent of the total collisions. The majority of collisions were either "rear end" (1473) or "right angle" (1140) in nature.

Greater than one half of all collisions were associated with intersections (Exhibit 2.7). 33.3 percent of collisions occurred at signalized intersections and 31.2 percent occurred at intersections with stop or yield control (Exhibit 2.8).

36 percent of all collisions occurred at locations with no form of traffic control.



Exhibit 2.1

INJURY STATUS OF ALL PERSONS INVOLVED

DESCRIPTION OF PERSONS INVOLVED	PERSONS INVOLVED	PERSONAL INJURIES/ FATALITIES	% OF PERSONS INJURED/ PERSONS INVOLVED	TYPE OF INJURY*			
				FATAL	MAJOR	MINOR	MINIMAL
DRIVER	10515	1811	17.2%	10	86	642	1073
CYCLIST	195	188	96.4%	3	12	91	82
PASSENGER	6705	1106	16.5%	2	64	377	663
PEDESTRIAN	350	340	97.1%	10	27	161	142
TOTAL	17765	3445	19.4%	25	189	1271	1960

SELECTED
CHARACTERISTICS

FOR APPROXIMATELY EVERY 25 RESIDENTS OF THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH, 1 PERSON WAS INVOLVED IN A MOTOR VEHICLE COLLISION IN 1991.

THERE WAS APPROXIMATELY A 1 IN 5 CHANCE THAT A PERSON INVOLVED IN A TRAFFIC COLLISION WOULD BE INJURED.

* Type of injury description

Major: Person admitted to hospital for treatment of injuries received in the collision.

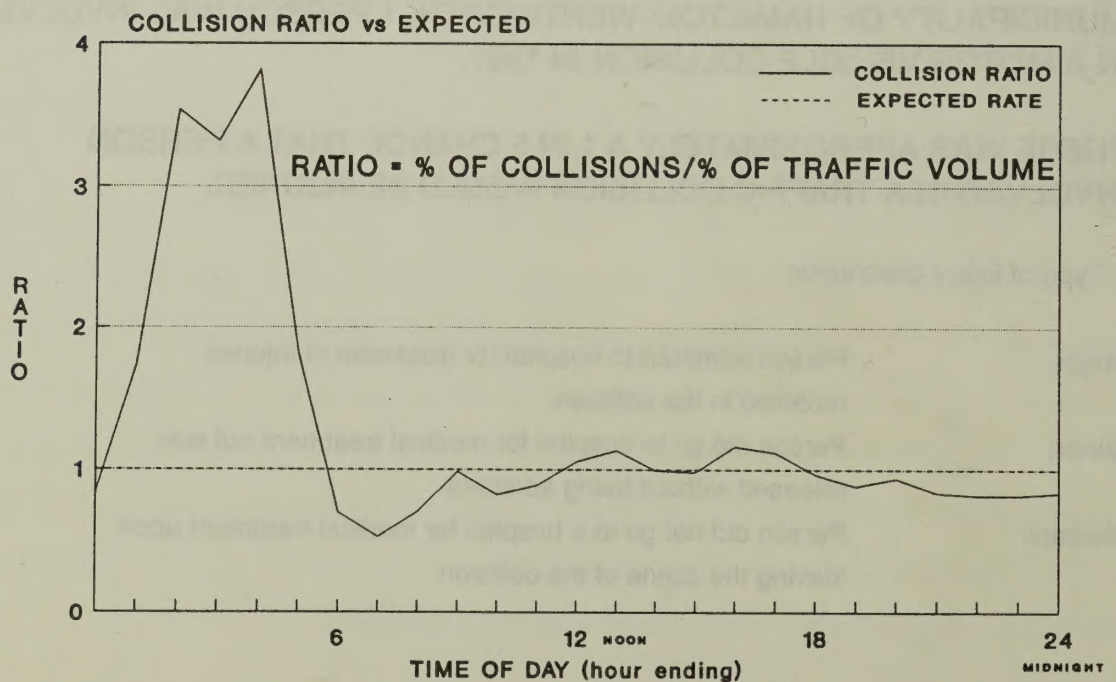
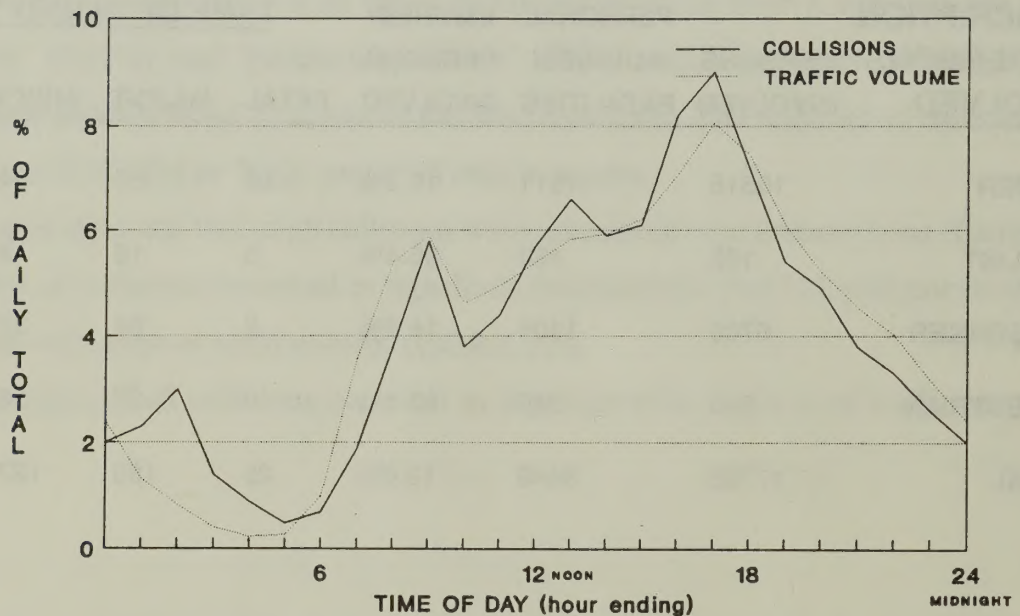
Minor: Person did go to hospital for medical treatment but was released without being admitted.

Minimal: Person did not go to a hospital for medical treatment upon leaving the scene of the collision.



Exhibit 2.2

TIME OF DAY vs TRAFFIC VOLUME



COLLISIONS OCCURRED AT A MUCH HIGHER THAN EXPECTED RATE (RELATIVE TO TRAFFIC VOLUME) BETWEEN MIDNIGHT AND 5 A.M DAILY



Exhibit 2.3

COLLISION OCCURENCES BY TIME OF
DAY AND DAY OF WEEK

TIME OF DAY	DAY OF WEEK							DAILY TOTAL	%
	MON.	TUES.	WED.	THURS.	FRI.	SAT.	SUN.		
12-1 a.m.	12	12	13	13	20	37	37	144	2.3%
1-2 a.m.	8	13	12	16	27	59	49	184	3.0%
2-3 a.m.	9	7	10	7	8	21	26	88	1.4%
3-4 a.m.	6	1	6	4	11	14	12	54	0.9%
4-5 a.m.	3	3	3	0	3	7	10	29	0.5%
5-6 a.m.	4	7	5	5	7	8	7	43	0.7%
6-7 a.m.	14	17	23	17	24	12	10	117	1.9%
7-8 a.m.	32	44	43	57	34	15	10	235	3.8%
8-9 a.m.	61	70	56	82	56	25	9	359	5.8%
9-10 a.m.	38	46	34	33	35	31	16	233	3.8%
10-11 a.m.	42	29	43	38	56	39	25	272	4.4%
11-12 NOON	49	48	60	55	65	44	31	352	5.7%
12-1 p.m.	68	60	53	52	74	66	31	404	6.6%
1-2 p.m.	51	45	46	48	76	63	35	364	5.9%
2-3 p.m.	42	55	54	53	68	63	40	375	6.1%
3-4 p.m.	79	67	90	66	102	60	38	502	8.2%
4-5 p.m.	75	68	102	102	108	62	33	550	9.0%
5-6 p.m.	55	71	61	86	89	46	35	443	7.2%
6-7 p.m.	52	51	52	66	47	36	28	332	5.4%
7-8 p.m.	40	32	45	63	58	45	19	302	4.9%
8-9 p.m.	26	32	29	36	48	41	24	236	3.8%
9-10 p.m.	33	21	34	30	34	28	25	205	3.3%
10-11 p.m.	25	17	12	25	37	29	13	158	2.6%
11-12 MIDNIGHT	18	9	19	13	26	28	10	123	2.0%
UNKNOWN	9	4	4	8	4	6	6	41	0.7%
WEEKLY TOTAL	851	829	909	975	1117	885	579	6145	100%

COLLISIONS WERE MOST LIKELY TO OCCUR BETWEEN 4 p.m. and 5 p.m.
ON WEDNESDAYS, THURSDAYS OR FRIDAYS.

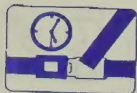
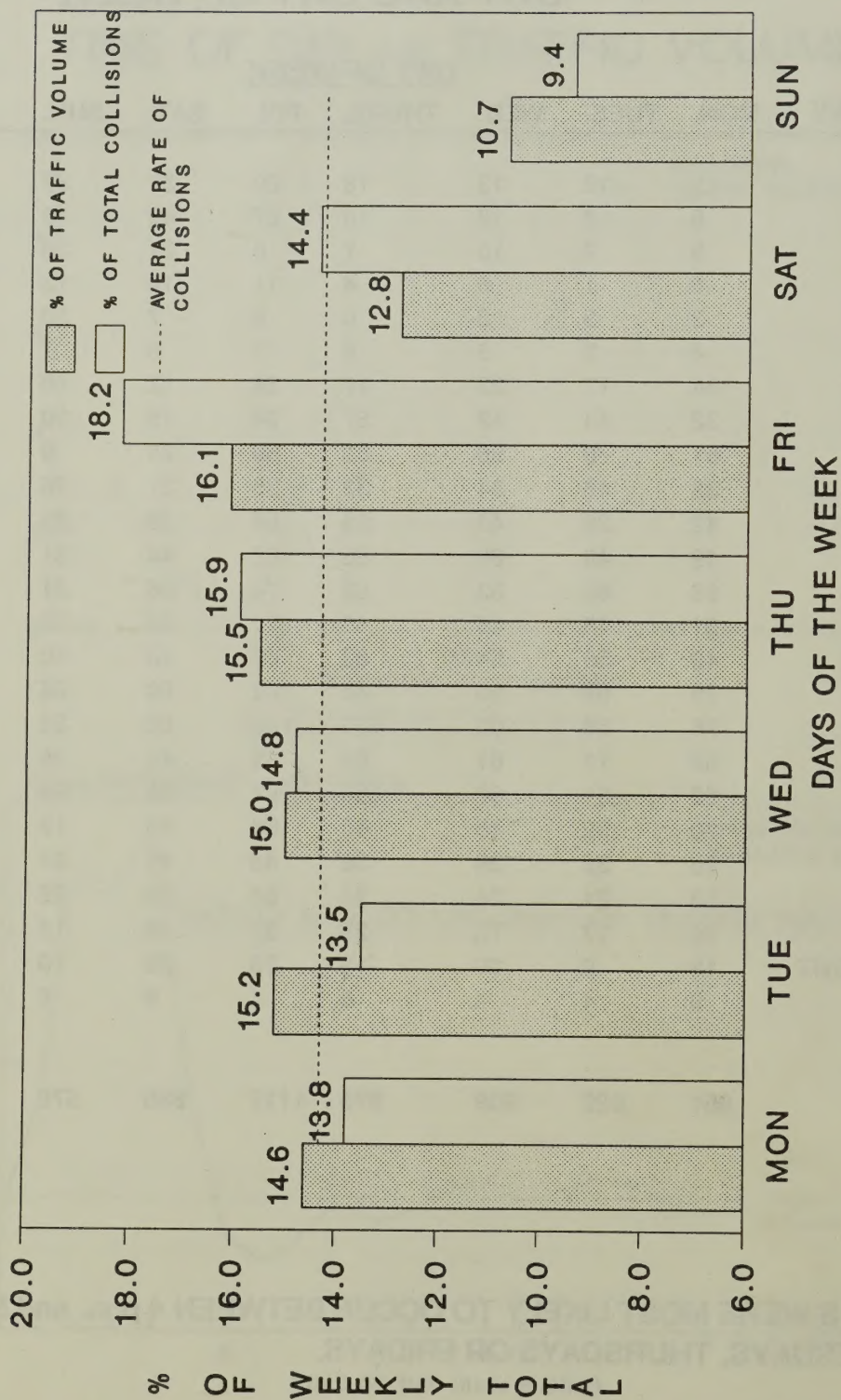


Exhibit 2.4

DAY OF WEEK vs COLLISIONS AND VOLUME



THURSDAY, FRIDAY AND SATURDAY HAD MORE COLLISIONS THAN EXPECTED WHEN COMPARED TO TRAFFIC VOLUME. THE HIGHEST NUMBER OF COLLISIONS OCCURRED ON FRIDAY WHICH ALSO HAD THE HIGHEST TRAFFIC VOLUME.

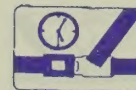
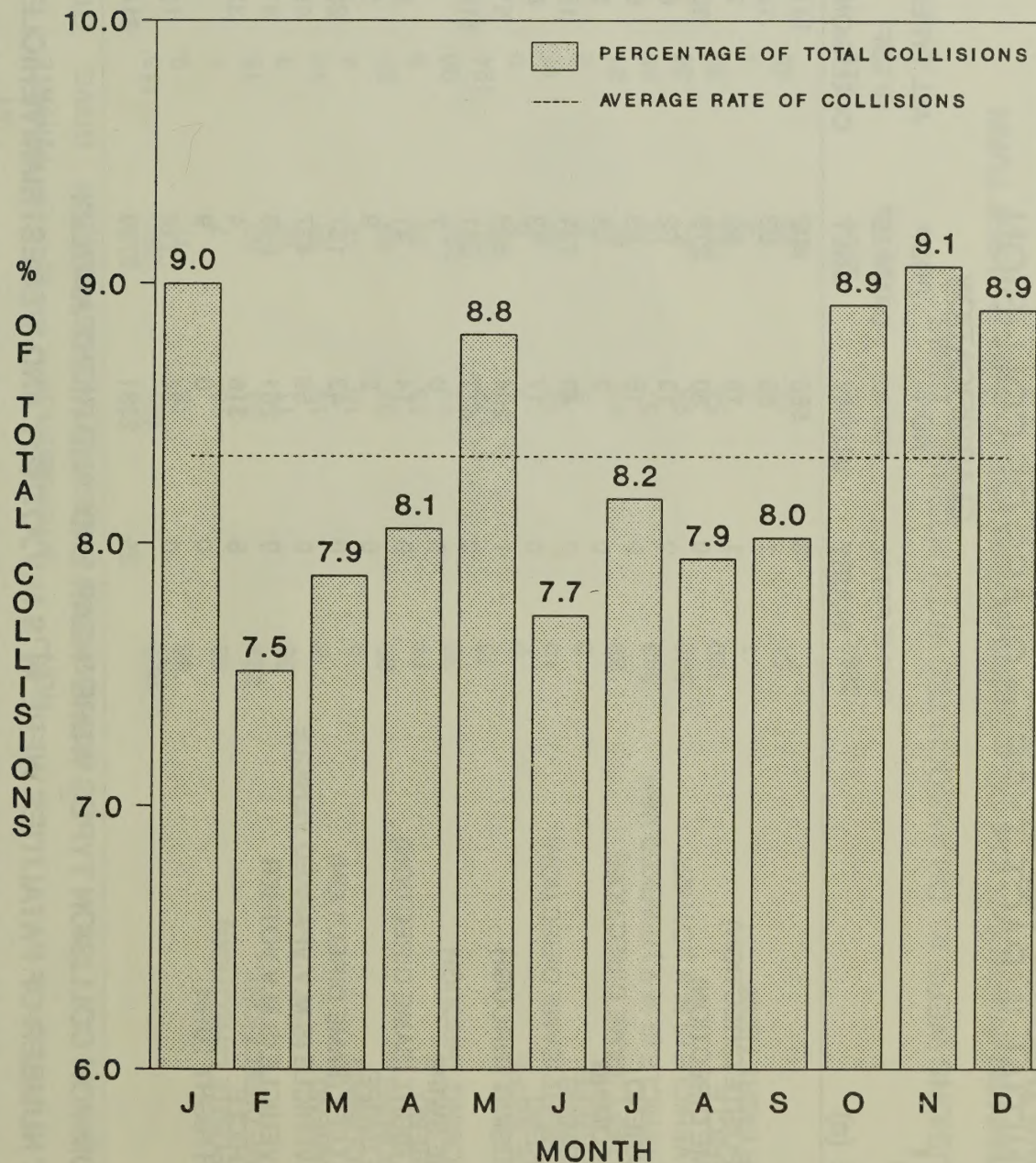


Exhibit 2.5

COLLISIONS vs MONTH OF THE YEAR



THE HIGHEST PERCENTAGE OF COLLISIONS
OCCURRED IN THE MONTHS OF
NOVEMBER AND JANUARY.

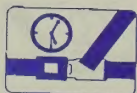


Exhibit 2.6

INITIAL IMPACT TYPE vs CLASS OF COLLISION

INITIAL IMPACT TYPE (a)	CLASSIFICATION				ALL TYPES OF COLLISIONS	% OF TYPE INVOLVING INJURY/ FATALITY
	FATAL INJURY	NON- FATAL INJURY	PROP. DAMAGE ONLY			
REAR END	3	668	802		1473	45.6%
HEAD ON	1	66	62		129	51.9%
SIDE SWIPE (OPPOSITE DIRECTION)	1	15	60		76	21.1%
SIDE SWIPE (SAME DIRECTION)	0	80	278		358	22.3%
OVERTAKING	0	13	52		65	20.0%
RIGHT TURN REAREND	0	16	50		66	24.2%
RIGHT TURN ONCOMING	0	9	24		33	27.3%
LEFT TURN ONCOMING	0	48	134		182	26.4%
LEFT TURN REAREND	0	17	43		60	28.3%
LEFT TURN OPPOSING THROUGH	1	204	309		514	39.9%
RIGHT ANGLE	2	477	661		1140	42.0%
RIGHT TURN SIDE SWIPE	0	0	7		7	0.0%
THROUGH WITH RIGHT (SAME DIRECTION)	0	14	41		55	25.5%
LEFT TURN SIDE SWIPE	0	2	9		11	18.2%
THROUGH WITH LEFT (SAME DIRECTION)	0	43	157		200	21.5%
SINGLE MOTOR VEHICLE (S.M.V.)/PARKED VEHICLE	0	58	427		485	12.0%
SINGLE MOTOR VEHICLE (S.M.V.)/OTHER	9	261	548		818	33.0%
PEDESTRIAN/VEHICLE	8	316	4		328	98.8%
LEFT TURN WITH RIGHT TURN	0	0	9		9	0.0%
OTHER	0	24	112		136	17.6%
TOTAL	25	2331	3789		6145	

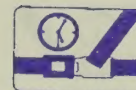
THE MOST COMMON COLLISION TYPES WERE 'REAR END' AND 'RIGHT ANGLE'.

THE HIGHEST NUMBER OF FATALITIES WERE IN 'S.M.V./OTHER' AND 'PEDESTRIAN/VEHICLE' COLLISIONS.

THE HIGHEST NUMBER OF INJURIES WERE IN 'REAR END' AND 'RIGHT ANGLE' COLLISIONS.

(a) The traffic movements causing these collisions are shown diagrammatically on the chart in Appendix A.1.

INITIAL IMPACT TYPE vs ROAD CLASSIFICATION



ROAD LOCATION

INITIAL IMPACT TYPE (a)	NON- INTERSECTION	INTERSECTION RELATED	IN INTERSECTION	AT	
				PRIVATE DRIVE	OTHER (b) TOTAL
REAR END HEAD ON	623 86	386 16	331 17	115 6	18 4
SIDE SWIPE (OPPOSITE DIRECTION)	56	10	7	1	2
SIDE SWIPE (SAME DIRECTION)	224	64	50	15	5
OVERTAKING	38	11	12	3	1
RIGHT TURN REAREND	5	15	34	12	0
RIGHT TURN ONCOMING	5	10	14	4	0
LEFT TURN ONCOMING	20	35	69	58	0
LEFT TURN REAREND	13	15	23	9	0
LEFT TURN OPPOSING THROUGH	33	77	344	60	4
RIGHT ANGLE	73	178	760	124	1
RIGHT TURN SIDE SWIPE	0	1	6	0	0
THROUGH WITH RIGHT (SAME DIRECTION)	10	10	24	11	0
LEFT TURN SIDE SWIPE	0	5	6	0	0
THROUGH WITH LEFT (SAME DIRECTION)	39	43	97	21	0
SINGLE MOTOR VEHICLE (S.M.V.) /PARKED VEH.	343	37	16	85	4
SINGLE MOTOR VEHICLE (S.M.V.)/OTHER	542	98	87	38	53
PEDESTRIAN/VEHICLE	120	54	133	20	1
LEFT TURN WITH RIGHT TURN	1	3	4	1	0
OTHER	51	12	25	46	2
TOTAL	2282	1080	2059	629	95
%	37.1%	17.6%	33.5%	10.2%	1.5% 100.0%

51% OF COLLISIONS WERE IN, OR ASSOCIATED WITH INTERSECTIONS.

THE MOST COMMON INTERSECTION COLLISIONS WERE 'RIGHT ANGLE', 'LEFT TURN WITH OPPOSING THROUGH' AND 'REAR END'.

THE MOST COMMON NON-INTERSECTION COLLISIONS WERE 'REAR END' AND 'SINGLE MOTOR VEHICLE'.

(a) The traffic movements causing these collisions are shown diagrammatically in Appendix A.1.

(b) "OTHER" includes 'at railroad', 'underpass or tunnel', 'overpass or bridge' and 'other'.



Exhibit 2.8

INITIAL IMPACT TYPE VS TYPE OF TRAFFIC CONTROL

TYPE OF TRAFFIC CONTROL AT LOCATION (a)

NO

INITIAL

IMPACT TYPE (b)

	TRAFFIC SIGNAL	STOP SIGN	YIELD SIGN	POLICE CONTROL	SCHOOL GUARD	CHOO BUS	TRAFFIC GATE	TRAFFIC* CONTROLLER	TRAFFIC CONTROL	OTHER	TOTAL
REAR END	583	280	21	1	2	2	3	1	576	4	1473
HEAD ON	16	34	2	0	0	0	0	0	76	1	129
SIDE SWIPE (OPPOSITE DIRECTION)	9	20	0	0	0	0	0	0	47	0	76
SIDE SWIPE REAR	120	57	4	0	0	0	0	1	175	1	358
OVERTAKING	21	12	0	0	0	0	0	0	32	0	65
RIGHT TURN REAR END	23	31	0	0	0	0	0	0	12	0	66
RIGHT TURN ONCOMING	10	16	0	0	0	0	0	0	7	0	33
LEFT TURN ONCOMING	35	95	0	0	0	0	0	0	51	1	182
LEFT TURN REAR END	17	24	2	0	0	0	0	0	17	0	60
LEFT TURN OPPOSING THROUGH	342	96	1	0	0	1	0	0	74	0	514
RIGHT ANGLE	411	589	5	1	0	0	0	1	132	1	1140
RIGHT TURN SIDE SWIPE	6	1	0	0	0	0	0	0	0	0	7
THRU. WITH RIGHT (SAME DIRECT'N)	23	14	0	0	0	0	0	0	17	1	55
LEFT TURN SIDE SWIPE	10	1	0	0	0	0	0	0	0	0	11
THRU. WITH LEFT (SAME DIRECT'N)	100	49	0	0	0	0	0	0	51	0	200
S.M.V./PARKED VEHICLE	34	157	0	0	0	0	0	0	294	0	485
S.M.V./OTHER	119	196	5	0	0	1	4	0	491	2	818
PEDESTRIAN/VEHICLE	135	99	1	0	2	0	0	0	91	0	328
LEFT TURN WITH RIGHT TURN	4	1	2	0	0	0	0	0	2	0	9
OTHER	30	38	1	0	0	0	0	1	65	1	136
TOTAL	2048	1810	44	2	4	4	7	4	2210	12	6145
%	33.3%	29.5%	0.7%	0.0%	0.1%	0.1%	0.1%	0.1%	36.0%	0.2%	100.0%

36% OF ALL COLLISIONS OCCURRED AT LOCATIONS WITH NO TRAFFIC CONTROL.

THE MOST COMMON COLLISION TYPE AT A TRAFFIC SIGNAL WAS 'REAR END'.

THE MOST COMMON COLLISION TYPE AT A STOP SIGN WAS 'RIGHT ANGLE'.

(a) Includes all collisions at both intersection and non-intersection locations.

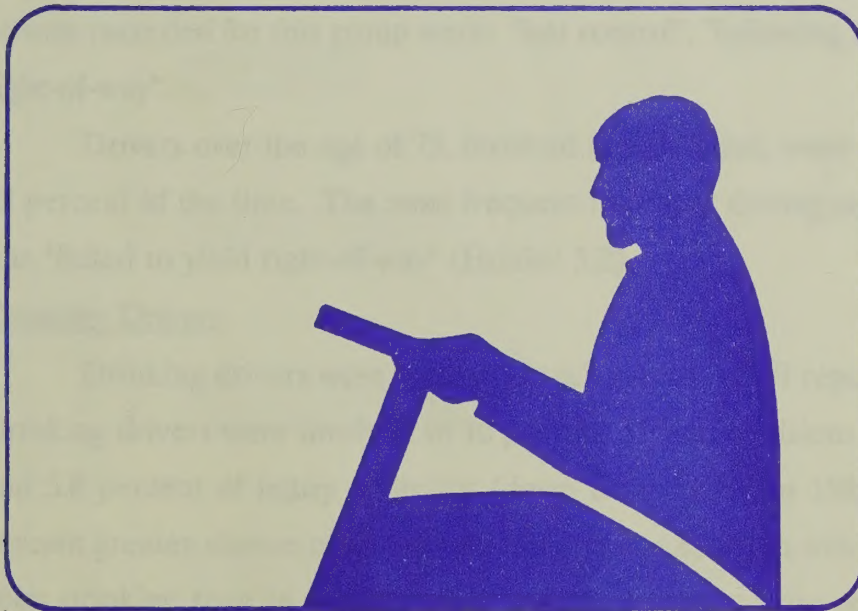
(b) The traffic movements causing these collisions are shown diagrammatically on the chart in Appendix A.1.



Driver Age

Although persons under the age of 25 are less than 14.5 percent of the licensed driver population, they are over-represented in traffic fatalities. In 1994, 17.5 percent of the licensed driver population was under the age of 25, but 22.5 percent of the traffic fatalities were under the age of 25.

Drivers under the age of 25 are more likely to be involved in traffic fatalities than older drivers. In 1994, 17.5 percent of the licensed driver population was under the age of 25, but 22.5 percent of the traffic fatalities were under the age of 25.



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Chapter Three Drivers

It was found that approximately 18 percent of the drivers involved in traffic fatalities were under the age of 25. This is a significant finding, as it indicates that young drivers are more likely to be involved in traffic fatalities than older drivers. In 1994, 17.5 percent of the licensed driver population was under the age of 25, but 22.5 percent of the traffic fatalities were under the age of 25.



Driver Age

Although persons under the age of 25 make up only 14.8 percent of the licensed driving population, this age group was involved in 17.4 percent of reported collisions (Exhibit 3.1).

Drivers under 20 years of age, involved in a collision, were recorded as driving properly less than 40 percent of the time (Exhibit 3.2). The most frequent improper driving actions recorded for this group were: "lost control", "following too close" and "failed to yield right-of-way".

Drivers over the age of 75, involved in a collision, were recorded as driving properly 35 percent of the time. The most frequent improper driving action recorded for this group was "failed to yield right-of-way" (Exhibit 3.2).

Drinking Drivers

Drinking drivers were involved in 6.3 percent of all reported collisions (Exhibit 3.3). Drinking drivers were involved in 16 percent of fatal collisions (down from 23.8% in 1985) and 5.8 percent of injury collisions (down from 11.3% in 1985). In 1985 there was a 33 percent greater chance of an injury occurring in a collision which involved a driver who had been drinking than in a collision in which all drivers were sober; there was a 7 percent greater chance in 1991.

Exhibit 3.4 indicates that 81 percent of collisions involving alcohol occurred during the period from 4 p.m. to 3 a.m.

Exhibit 3.5 indicates that less than 16 percent of the drivers involved in collisions who had been drinking but were not charged with being impaired, were driving properly. Less than 6 percent of drivers who were impaired due to alcohol were recorded as driving properly at the time of the collision. The most frequently indicated improper driver action was loss of control of the vehicle.

Drivers between the ages twenty and forty-four had the highest probability of being under the influence of alcohol at the time of a collision (Exhibit 3.6).

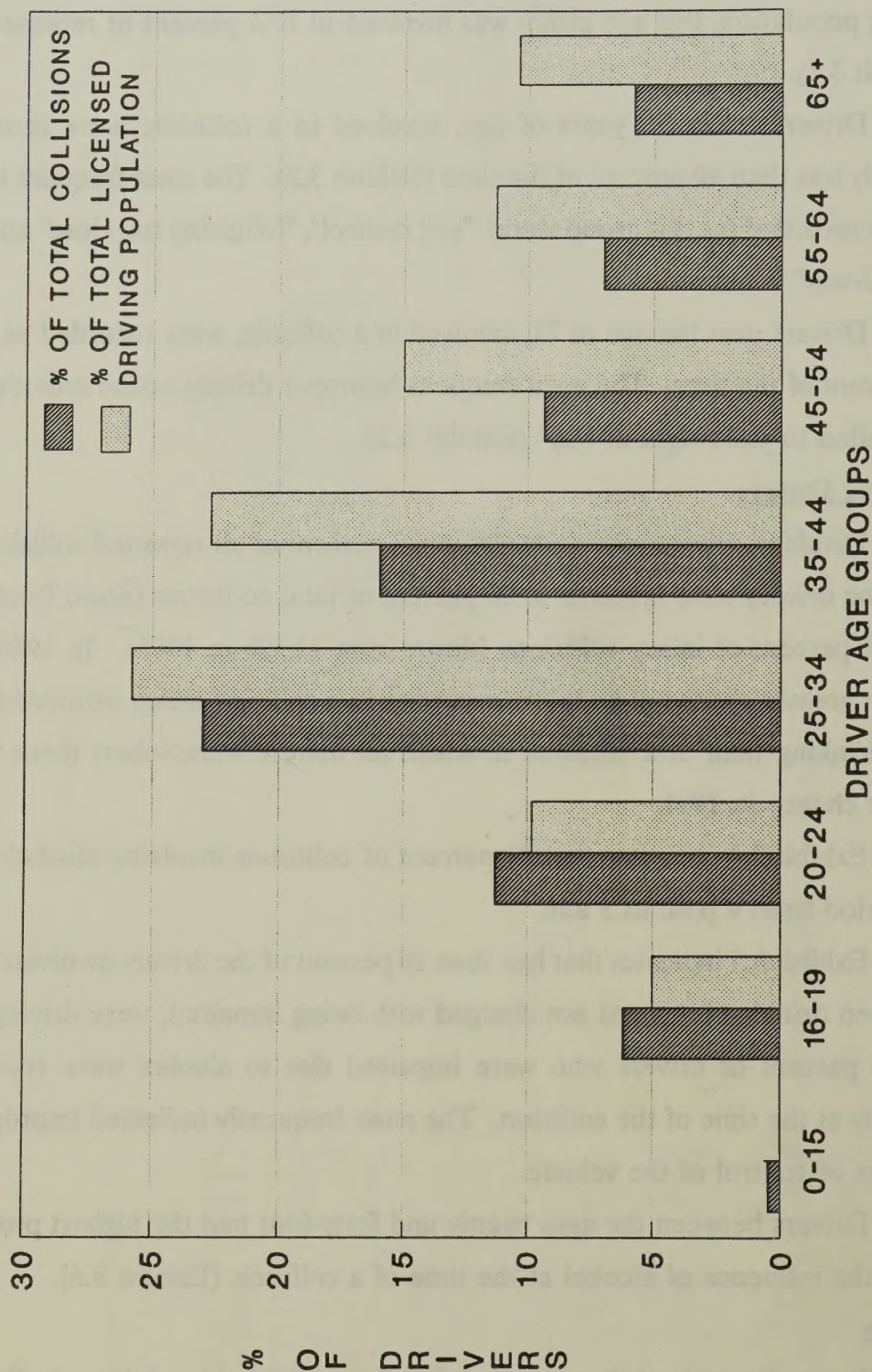
Cyclists

It was determined that responsibility for a collision involving a cyclist decreased with increased cyclist age and that 27.5 percent or less of cyclists under 19, involved in collisions, were recorded as driving properly (Exhibit 3.7). The most predominant known cyclist improper action indicated was failure to yield right-of-way.



MOTOR VEHICLE DRIVER AGE VS COLLISION INVOLVEMENT

Exhibit 3.1



DRIVERS UNDER 24 YEARS OF AGE ARE INVOLVED IN MORE COLLISIONS THAN EXPECTED
BASED ON THE AGE DISTRIBUTION OF THE LICENSED DRIVING POPULATION OF ONTARIO.



Exhibit 3.2

MOTOR VEHICLE DRIVER AGE vs DRIVER ACTION

DRIVER AGE

DRIVER ACTION	0-15	16-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	TOTAL	% OF ALL ACTIONS
DRIVING PROPERLY	8	284	679	1596	1235	696	486	240	69	5293	49.8%
FOLLOWING TOO CLOSE	0	108	167	323	192	110	74	46	18	1038	9.8%
EXCEEDING SPEED LIMIT	0	9	20	24	4	3	0	2	1	63	0.6%
SPEED TOO FAST	0	30	28	47	28	14	7	2	1	157	1.5%
SPEED TOO SLOW	0	1	0	1	0	0	0	0	0	2	0.02%
IMPROPER TURN	2	56	72	126	100	68	70	47	20	561	5.3%
DISOBEYED TRAF. CONTROL	8	44	81	149	78	48	63	37	20	528	5.0%
FAILED TO YIELD R.O.W.	21	99	158	325	195	150	117	113	51	1229	11.6%
IMPROPER PASSING	0	5	14	21	11	4	4	3	2	64	0.6%
LOST CONTROL	9	110	141	250	138	67	49	29	6	799	7.5%
WRONG WAY ON ONE-WAY	2	4	6	9	5	5	2	3	0	36	0.3%
IMPROPER LANE CHANGE	1	23	46	66	55	46	25	22	9	293	2.8%
OTHER	13	53	107	159	108	47	42	28	12	569	5.4%
TOTAL	64	826	1519	3096	2149	1258	939	572	209	10632	100.0%
% DRIVERS INVOLVED DRIVING PROPERLY (a)	15.7%	36.7%	48.1%	54.3%	60.5%	57.5%	54.2%	44.1%	35.0%	52.6%	

THE OVERALL PERCENTAGE OF DRIVERS DRIVING PROPERLY WAS 53%.

YOUNGER AND OLDER DRIVERS WERE LEAST LIKELY TO BE DRIVING PROPERLY.

THE MOST FREQUENTLY RECORDED IMPROPER DRIVING ACTION WAS FAILING TO YIELD RIGHT-OF-WAY.

(a) Excluding "Other".



Exhibit 3.5

DRIVER ACTION vs

DRIVER CONDITION

DRIVER ACTION	IMPAIRED-				
	NORMAL	HAD BEEN DRINKING (a)	ALCOHOL OVER .08 (b)	IMPAIRED- ALCOHOL (c)	IMPAIRED- DRUGS (d)
DRIVING PROPERLY	5178	24	7	2	2
FOLLOWING TOO CLOSE	922	10	10	1	0
EXCEEDING SPEED LIMIT	42	10	9	1	0
SPEED TOO FAST	121	9	7	4	0
SPEED TOO SLOW	1	0	0	0	0
IMPROPER TURN	512	6	3	1	0
DISOBEYED TRAFFIC CONTROL	430	12	16	1	1
FAILED TO YIELD R.O.W.	1103	15	8	2	0
IMPROPER PASSING	53	3	2	1	0
LOST CONTROL	551	64	66	27	3
WRONG WAY ON ONE-WAY	26	2	1	2	0
IMPROPER LANE CHANGE	264	3	1	2	0
OTHER	398	18	34	9	3
TOTAL	9601	176	164	53	9
% DRIVERS INVOLVED DRIVING PROPERLY (e)	56.3%	15.2%	5.4%	4.5%	33.3%

LESS THAN 16% OF DRIVERS WHO HAD BEEN DRINKING AND LESS THAN 6% OF DRIVERS WHO WERE IMPAIRED DUE TO ALCOHOL WERE RECORDED AS DRIVING PROPERLY AT THE TIME OF THE COLLISION.



DRIVER CONDITION

MEDICAL							
FATIGUE	DISABILITY	INATTENTIVE	UNKNOWN	OTHER	TOTAL		%
0	4	8	145	1	5371		48.8%
1	0	38	89	1	1072		9.7%
0	0	1	6	0	69		0.6%
0	0	3	16	0	160		1.5%
0	0	0	1	0	2		0.0%
1	0	26	28	2	579		5.3%
3	2	34	48	0	547		5.0%
1	0	43	83	4	1259		11.4%
0	0	1	14	0	74		0.7%
12	8	14	131	4	880		8.0%
0	0	4	4	0	39		0.4%
0	0	18	27	0	315		2.9%
6	7	33	123	8	639		5.8%
24	21	223	715	20	11006		100.0%
0.0%	28.6%	4.2%	24.5%	8.3%	51.8%		

- (a) Driver had consumed alcohol but his/her physical condition was not legally impaired.
- (b) Driver had consumed alcohol and upon testing was found to have a blood-alcohol level in excess of 80 mg.
- (c) Driver had consumed sufficient alcohol to warrant being charged with a drinking and driving offence in the judgement of the investigating officer.
- (d) Driver had used drugs and was legally impaired in the judgement of the investigating officer.
- (e) Excluding not known and other.

Exhibit 3.6

DRIVER AGE VS DRIVER CONDITION

DRIVER CONDITION	DRIVER AGE										NO DRIVER UNKNOWN	TOTAL	%
	0-15	16-19	20-24	25-34	35-44	45-54	55-64	65-74	75+				
NORMAL	53	731	1319	2741	1934	1158	843	518	183	2	118	9600	87.1%
HAD BEEN DRINKING	0	8	33	64	41	12	7	6	1	0	4	176	1.6%
IMPAIRED- ALCOHOL OVER .08	0	9	32	56	37	11	11	7	0	0	1	164	1.5%
IMPAIRED- ALCOHOL	0	2	4	26	6	7	4	2	0	0	2	53	0.5%
IMPAIRED- DRUGS	0	1	0	7	0	0	0	1	0	0	0	9	0.1%
FATIGUE	1	1	6	7	5	1	2	1	0	0	0	24	0.2%
MEDICAL DISABILITY	0	1	2	3	3	0	4	6	2	0	0	21	0.2%
INATTENTIVE	6	29	28	59	25	18	29	13	12	0	4	223	2.0%
NOT KNOWN	3	42	92	130	96	50	36	17	9	0	260	735	6.7%
OTHER	1	2	3	3	2	1	3	1	2	0	2	20	0.2%
TOTAL	64	826	1519	3096	2149	1258	939	572	209	2	391	11025	100.0%
% DRINKING DRIVERS INVOLVED (a)	0.0%	2.4%	4.8%	4.9%	4.1%	2.5%	2.4%	2.7%	0.5%	0.0%	5.4%		

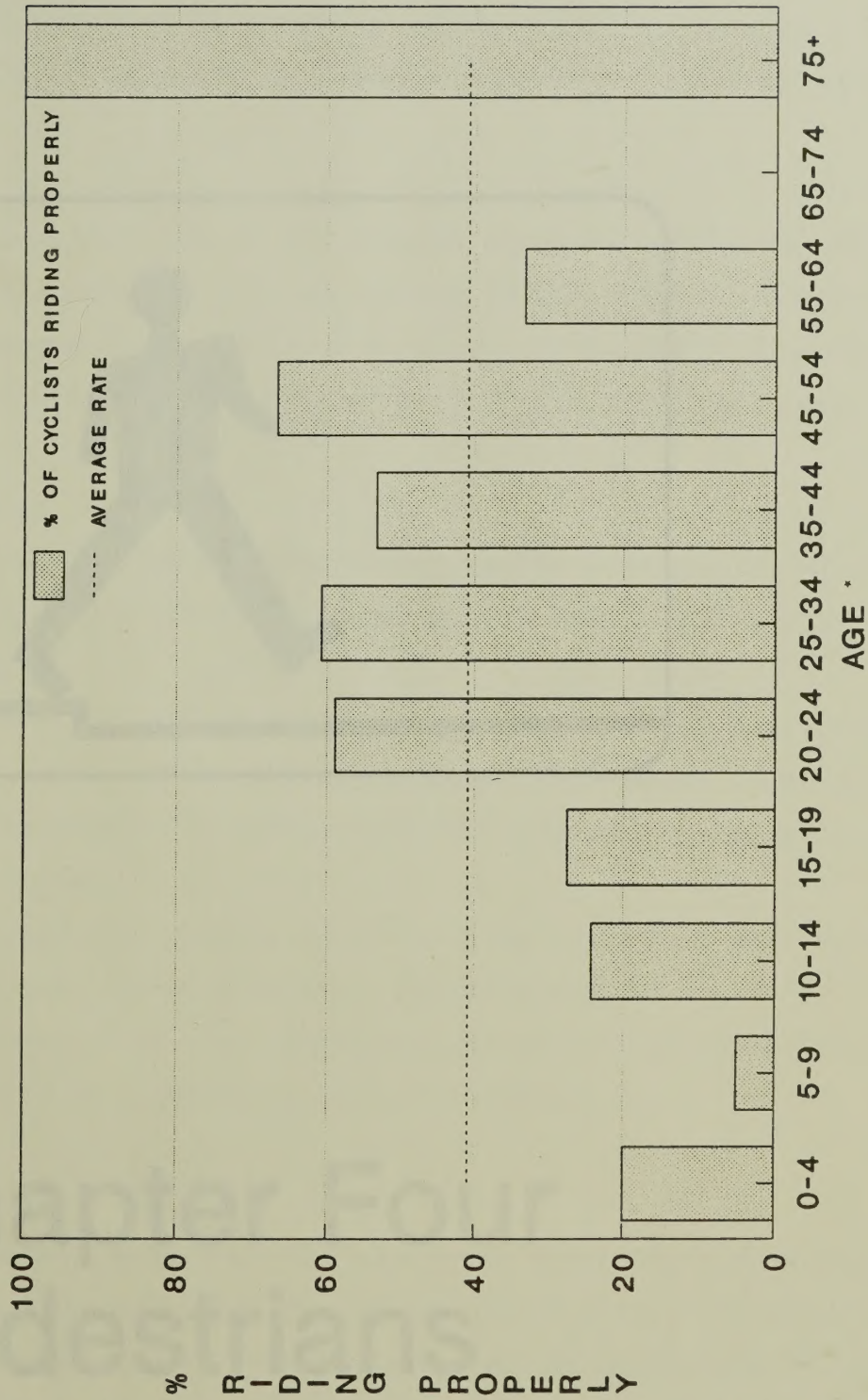
DRIVERS IN THE AGE GROUP 20 TO 44 WERE MOST LIKELY TO HAVE CONSUMED ALCOHOL BEFORE BEING INVOLVED IN A COLLISION.

(a) Excluding not known and other.



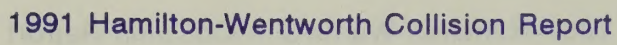


Exhibit 3.7 CYCLIST ACTIONS IN MOTOR VEHICLE COLLISIONS: PERCENTAGE RIDING PROPERLY VS AGE GROUP



THE 5 TO 9 YEAR OLD AGE GROUP HAD THE
POOREST RIDING PERFORMANCE.

•Small number of involved cyclists over the age of 44





Chapter Four

Pedestrians



Chapter Four Pedestrians



Chapter 4

General

In 1991, there were 332 pedestrian collisions (Exhibit 2.1) resulting in 330 injuries and 10 fatalities (10 pedestrians were involved in a collision but were not hurt).

Age

The relationship between the Regional population distribution and pedestrian involvement in collisions in 1991 was reviewed (Exhibit 4.1). It was determined that pedestrians between the ages of 5 to 19 were significantly over-represented in pedestrian collisions when compared to the age distribution of the Regional population.

Pedestrian Action

Exhibit 4.2 shows the pedestrian actions at the time of the collisions versus pedestrian age. In general, the instances of unsafe pedestrian action were greater for pedestrians under 15 years of age.

This exhibit also indicates that the actions of "coming from behind a parked car" or "unexpectedly running into the roadway" accounted for 21.2 percent of pedestrian actions at the time of the collision. These unsafe actions are particularly associated with pedestrians under 15 years of age.

41.5 percent of all pedestrian collisions indicate that the pedestrian was involved in an unsafe action (e.g. coming from behind a parked vehicle).

Examination of the data for pedestrian collisions at traffic signals indicates that in over 60% of cases, the pedestrian was not at fault (Exhibit 4.3).

Time of Collisions

An analysis was performed which examined the time of day when collisions occurred and compared this to the number of pedestrians injured (Exhibit 4.4). It was determined that 32.6 percent of pedestrians were injured in collisions which occurred between 3 p.m. and 6 p.m. Exhibit 4.5 compares the time of day of pedestrian collisions with pedestrian age. 72 pedestrians between the ages 5 to 19 were involved in pedestrian collisions which occurred at school crossing times.* This represents 20.6 percent of the 350 pedestrians involved in collisions in 1991.



Chapter Four Pedestrians



Chapter 4

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- * School crossing times: 8:00 a.m. - 9:15 a.m., 11:30 a.m. - 1:45 p.m.
3:30 p.m. - 4:45 p.m., Monday - Friday; excluding June, July and August.

Pedestrian Condition

In most cases, the condition of the pedestrian (Exhibit 4.6) involved in the collision was reported as normal (65% of the time). However, in approximately 8 percent of the collisions involving pedestrians, the pedestrian condition was recorded as "had been drinking" or "impaired".

Location

Exhibit 4.7 examines the type of traffic control at locations where pedestrian collisions occurred. In 41 percent of the pedestrian collisions, the collision occurred at a traffic signal, 30 percent at a stop sign and 29 percent at a location with no control.

Driver Action

Exhibit 4.8 indicates that in 66 percent of the motor vehicle/pedestrian collisions, the driver was recorded as driving properly. This figure does not necessarily suggest that the drivers involved in these collisions were totally without blame but does indicate that a majority of pedestrian collisions are associated with improper pedestrian action or lack of awareness of traffic conditions at the time of the collision.

Of the 34 percent of motor vehicle/pedestrian collisions in which the driver was not driving properly, the most frequently recorded driver action was "failing to yield the right-of-way" (associated with 21.3% of all motor vehicle - pedestrian collisions).

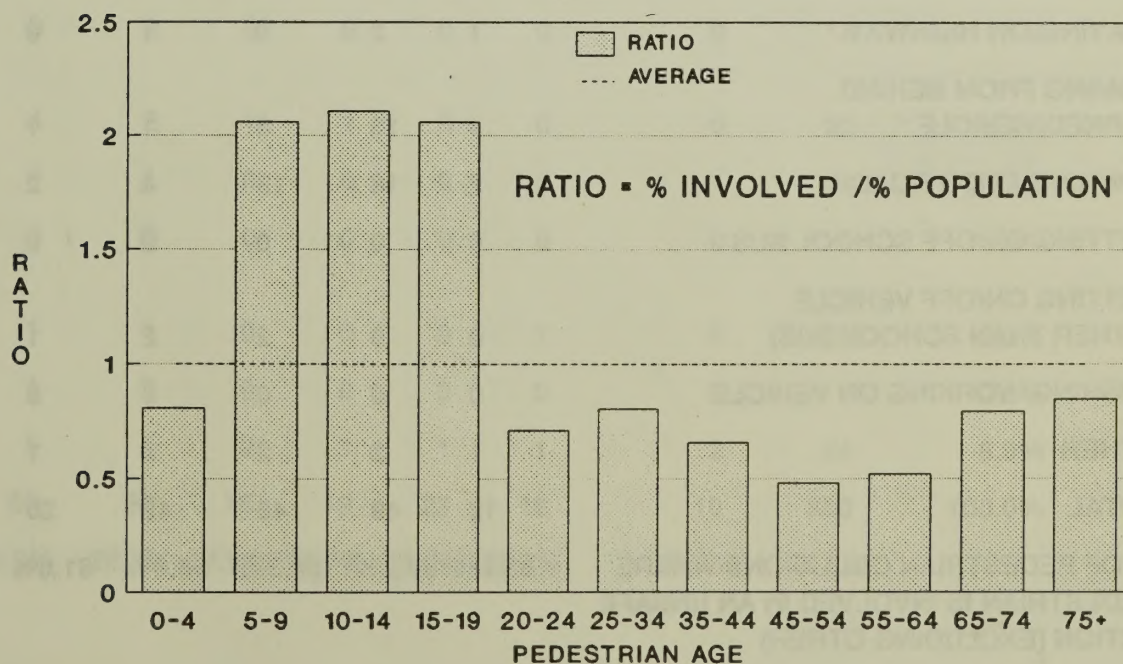
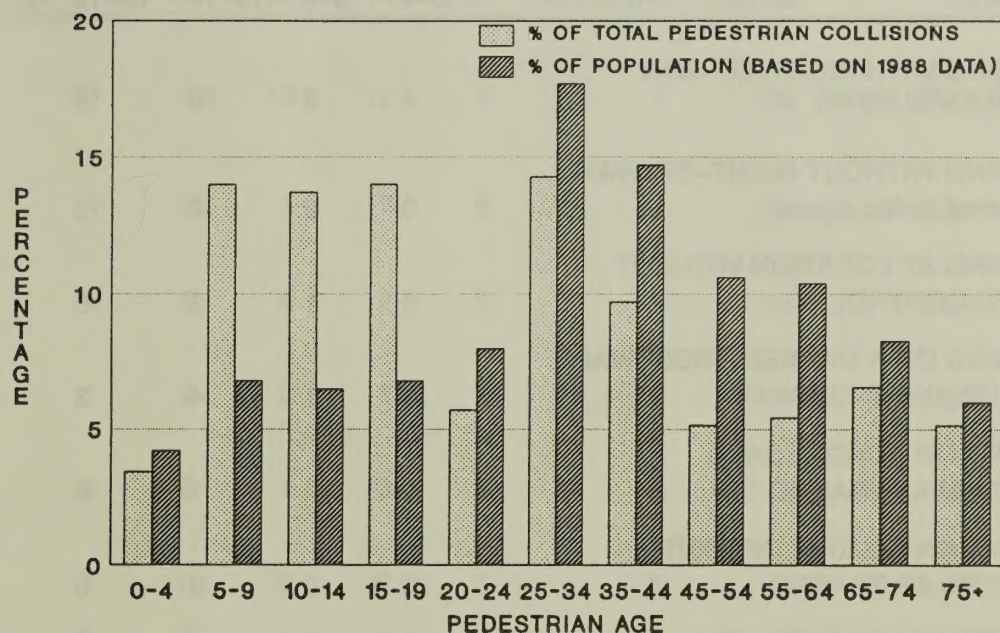
Pedestrian Injuries

Most pedestrians (approximately 90%) suffered no, minimal or minor injuries when involved in a collision.



Exhibit 4.1

PEDESTRIAN AGE VS COLLISION INVOLVEMENT



PEDESTRIANS FROM 5 TO 19 YEARS OLD ARE SIGNIFICANTLY OVER-REPRESENTED IN PEDESTRIAN COLLISIONS BASED ON THE AGE DISTRIBUTION OF POPULATION OF HAMILTON-WENTWORTH.



Exhibit 4.2

PEDESTRIAN AGE vs PEDESTRIAN ACTION (ALL LOCATIONS)

PEDESTRIAN ACTION	PEDESTRIAN AGE				
	0-4	5-9	10-14	15-19	20-24
CROSSING WITH RIGHT-OF-WAY (i.e. with traffic signal)	4	3	10	18	8
CROSSING WITHOUT RIGHT-OF-WAY * (i.e. against traffic signal)	0	8	8	12	3
CROSSING AT LOCATION WITHOUT TRAFFIC CONTROL	0	1	3	0	3
CROSSING ON A MARKED CROSSWALK, WITHOUT RIGHT-OF-WAY	0	1	4	3	1
WALKING ON ROAD IN SAME DIRECTION AS TRAFFIC *	0	0	1	0	0
WALKING ON ROAD IN OPPOSITE DIRECTION AS TRAFFIC	0	0	0	0	0
ON SIDEWALK OR SHOULDER	0	1	2	6	0
PLAYING ON HIGHWAY *	1	2	0	1	0
COMING FROM BEHIND PARKED VEHICLE *	4	13	3	1	1
RUNNING ONTO ROAD *	2	18	13	4	2
GETTING ON/OFF SCHOOL BUS	0	0	0	0	0
GETTING ON/OFF VEHICLE (OTHER THAN SCHOOL BUS)	0	0	2	2	1
PUSHING/WORKING ON VEHICLE	0	0	0	0	0
OTHER	1	2	2	2	1
TOTAL	12	49	48	49	20
% OF PEDESTRIAN COLLISIONS WHERE PEDESTRIAN IS INVOLVED IN AN UNSAFE ACTION (EXCLUDING OTHER)	63.6%	87.2%	54.3%	38.3%	31.6%

THE INSTANCES OF UNSAFE PEDESTRIAN ACTIONS WERE HIGHEST FOR THE UNDER 15 AGE GROUP.

* Actions considered unsafe



25-34	35-44	45-54	55-64	65-74	75+	UNKNOWN	TOTAL	%
17	12	6	10	12	5	1	106	30.3%
5	5	5	1	7	6	4	64	18.3%
6	4	2	4	2	3	1	29	8.3%
2	1	0	0	1	1	0	14	4.0%
1	0	0	1	0	0	0	3	0.9%
0	1	0	0	0	0	0	1	0.3%
5	3	2	1	0	1	1	22	6.3%
0	0	0	0	0	0	0	4	1.1%
4	2	1	1	0	0	0	30	8.6%
3	1	0	0	0	0	1	44	12.6%
0	0	0	0	0	0	0	0	0.0%
1	1	0	0	0	1	0	8	2.3%
1	0	0	0	0	0	0	1	0.3%
5	4	2	1	1	1	2	24	6.9%
50	34	18	19	23	18	10	350	100.0%
28.9%	26.7%	37.5%	16.7%	31.8%	35.3%	62.5%	44.5%	

21% OF PEDESTRIANS INVOLVED IN COLLISIONS ENTERED THE ROADWAY UNEXPECTEDLY (CAME FROM BEHIND PARKED CARS OR RAN INTO THE ROADWAY).



Exhibit 4.3

PEDESTRIAN AGE vs PEDESTRIAN ACTION (AT TRAFFIC SIGNALS)

PEDESTRIAN ACTION	PEDESTRIAN AGE					
	0-4	5-9	10-14	15-19	20-24	25-34
CROSSING WITH RIGHT-OF-WAY (i.e. with traffic signal)	2	2	6	12	4	14
CROSSING WITHOUT RIGHT-OF-WAY * (i.e. against traffic signal)	0	5	2	7	1	3
CROSSING AT LOCATION WITHOUT TRAFFIC CONTROL	0	0	0	0	1	0
CROSSING ON A MARKED CROSSWALK, WITHOUT RIGHT-OF-WAY	0	1	3	2	1	1
WALKING ON ROAD IN THE SAME DIRECTION AS TRAFFIC *	0	0	0	0	0	0
WALKING ON ROAD IN OPPOSITE DIRECTION AS TRAFFIC	0	0	0	0	0	0
ON SIDEWALK OR SHOULDER	0	0	0	1	0	2
PLAYING ON HIGHWAY *	0	0	0	1	0	0
COMING FROM BEHIND PARKED VEHICLE *	0	0	0	0	0	2
RUNNING ONTO ROAD *	1	0	0	0	0	0
GETTING ON/OFF VEHICLE (OTHER THAN SCHOOL BUS)	0	0	0	0	0	0
PUSHING/WORKING ON VEHICLE	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	3	8	11	23	7	22
% OF PEDESTRIAN COLLISIONS WHERE PEDESTRIAN IS INVOLVED IN AN UNSAFE ACTION (EXCLUDING OTHER)	33.3%	62.5%	18.2%	34.8%	14.3%	22.7%

**YOUNG PEDESTRIANS BETWEEN THE AGES OF 5 & 9
WERE MORE LIKELY TO BE INVOLVED IN COLLISIONS AT TRAFFIC
SIGNALS DUE TO UNSAFE ACTIONS THAN OTHER AGE GROUPS.**

* Actions considered unsafe

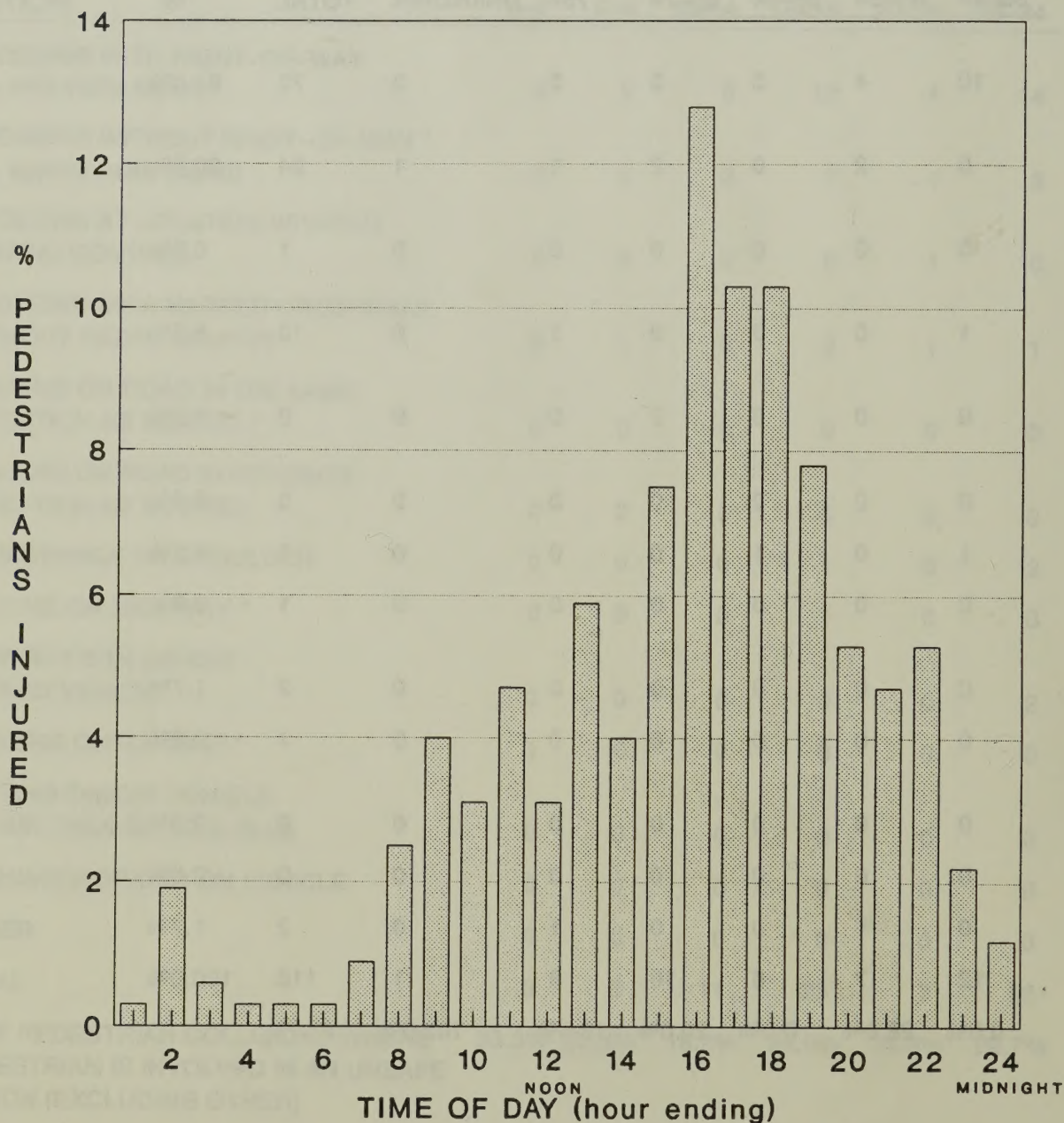


35-44	45-54	55-64	65-74	75+	UNKNOWN	TOTAL	%
10	4	5	8	5	0	72	61.0%
0	2	0	2	1	1	24	20.3%
0	0	0	0	0	0	1	0.8%
1	0	0	0	1	0	10	8.5%
0	0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0.0%
1	0	1	0	0	0	5	4.2%
0	0	0	0	0	0	1	0.8%
0	0	0	0	0	0	2	1.7%
0	0	0	0	0	0	1	0.8%
0	0	0	0	0	0	0	0.0%
0	0	0	0	0	0	0	0.0%
0	1	0	0	1	0	2	1.7%
12	7	6	10	8	1	118	100.0%
0.0%	28.6%	0.0%	20.0%	12.5%	100.0%	23.7%	



Exhibit 4.4

TIME OF DAY vs NUMBER OF PEDESTRIANS INJURED



THE HIGHEST NUMBER OF PEDESTRIAN
COLLISIONS OCCURED BETWEEN THE HOURS OF
3 p.m. - 6 p.m.



Exhibit 4.5

TIME OF DAY vs PEDESTRIAN AGE

PEDESTRIAN AGE

TIME OF DAY	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+	UNKNOWN	TOTAL
12-1 a.m.	0	0	0	1	0	0	0	0	0	0	0	0	1
1-2 a.m.	0	0	0	3	1	3	2	0	0	0	0	0	9
2-3 a.m.	0	0	0	1	0	0	0	0	0	0	0	2	1
3-4 a.m.	0	0	0	0	0	0	0	0	0	0	1	0	1
4-5 a.m.	0	0	0	0	1	0	0	0	0	0	0	0	1
5-6 a.m.	0	0	0	0	0	0	0	1	0	0	0	0	1
6-7 a.m.	0	0	0	0	0	0	0	3	0	0	0	0	3
7-8 a.m.	1	0	0	3	0	2	1	2	0	0	0	0	9
8-9 a.m.	0	5	6	1	1	2	0	0	0	1	0	0	16
9-10 a.m.	0	0	1	0	1	1	1	1	4	0	2	0	11
10-11 a.m.	0	0	0	2	1	3	3	1	3	1	1	0	15
11-12 NOON	1	2	1	1	0	3	0	0	0	1	1	0	10
12-1 p.m.	0	3	3	2	2	2	2	1	1	2	2	0	20
1-2 p.m.	2	0	3	0	1	3	1	0	1	1	1	0	13
2-3 p.m.	0	5	2	3	2	2	1	4	0	3	3	0	25
3-4 p.m.	1	9	4	14	0	1	4	1	3	4	1	1	42
4-5 p.m.	2	8	7	7	1	5	4	0	1	2	1	0	38
5-6 p.m.	1	7	8	3	2	7	3	0	2	1	0	0	34
6-7 p.m.	1	3	3	2	4	2	2	1	1	3	2	3	24
7-8 p.m.	1	3	2	1	0	5	4	1	2	0	0	0	19
8-9 p.m.	2	2	5	1	2	3	0	1	0	1	1	1	18
9-10 p.m.	0	2	1	1	0	3	3	1	1	1	1	3	14
10-11 p.m.	0	0	0	1	1	3	1	0	0	1	1	0	8
MIDNIGHT	0	0	1	1	0	0	2	0	0	1	0	0	5
UNKNOWN	0	0	1	1	0	0	0	0	0	0	0	0	2
TOTAL	12	49	48	49	20	50	34	18	19	23	18	10	350

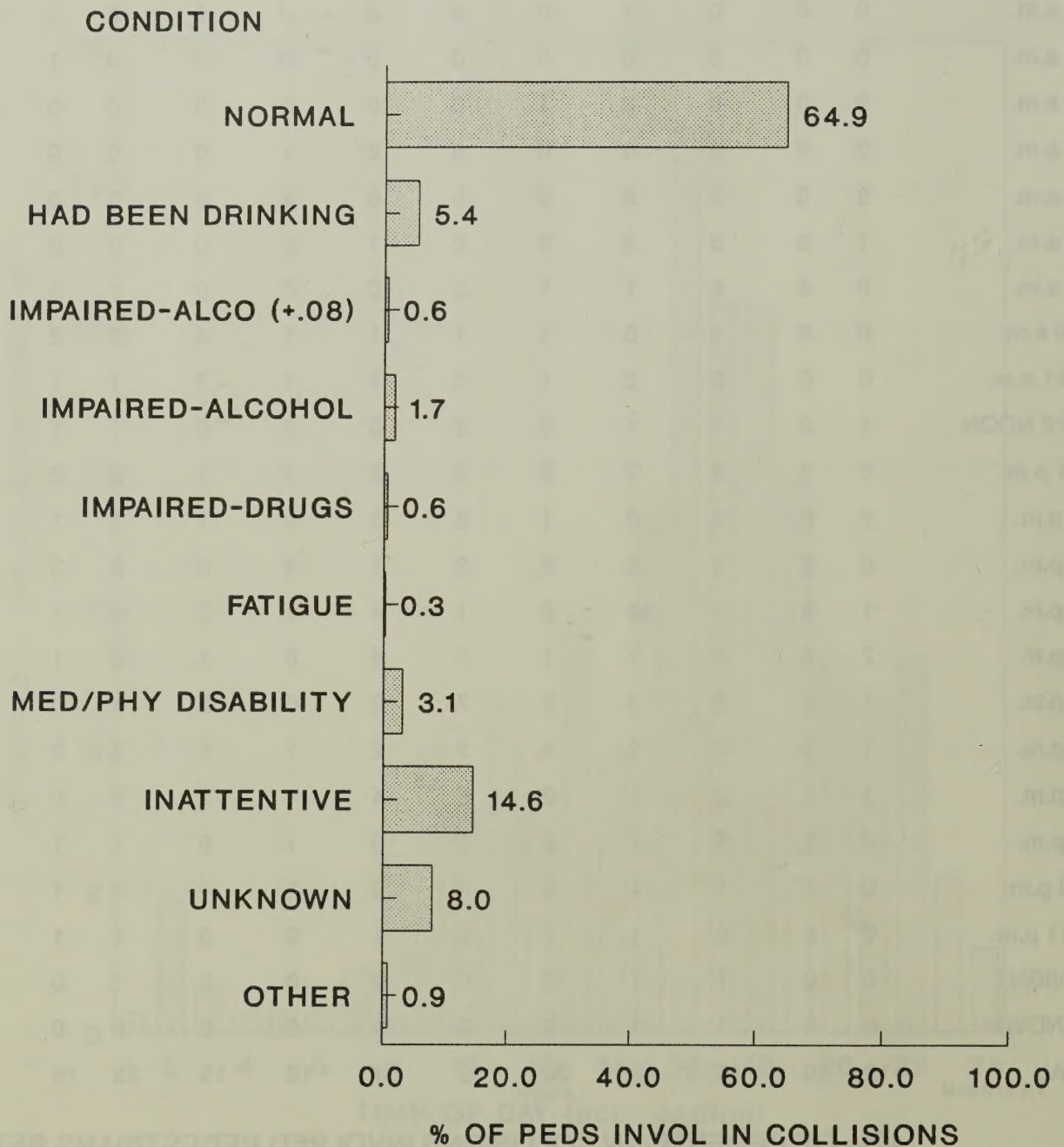
42% OF PEDESTRIAN COLLISIONS INVOLVED PEDESTRIANS BETWEEN AGES OF 5 AND 19.

33% OF PEDESTRIAN COLLISIONS OCCURRED BETWEEN THE HOURS OF 3 p.m. - 6 p.m.



Exhibit 4.6

CONDITION OF PEDESTRIANS INVOLVED IN COLLISIONS

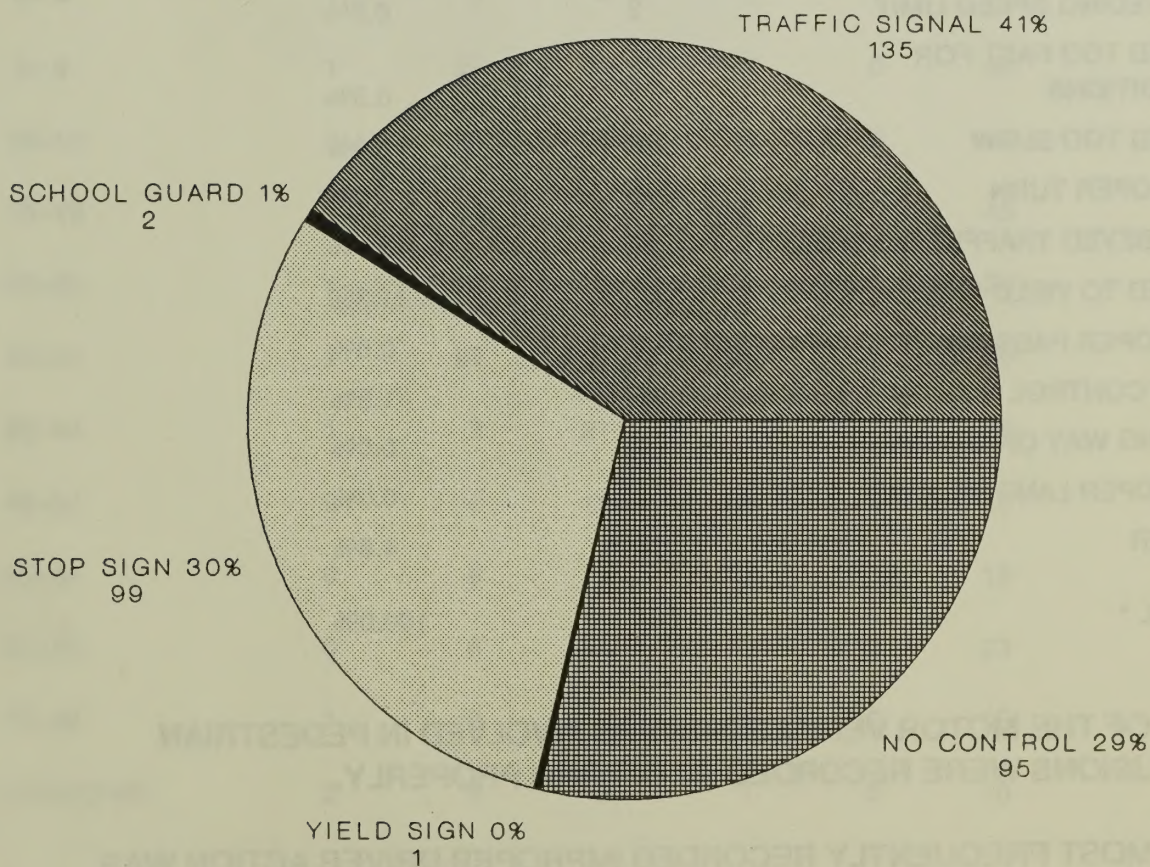


7.7% OF PEDESTRIANS INVOLVED IN COLLISIONS HAD CONSUMED ALCOHOL.



Exhibit 4.7

TYPE OF TRAFFIC CONTROL AT LOCATIONS WHERE PEDESTRIAN COLLISIONS OCCURRED



ABOUT ONE HALF OF COLLISIONS AT INTERSECTIONS WITH STOP SIGNS OCCURRED WHILE PEDESTRIAN WAS CROSSING A LEG OF THE INTERSECTION CONTROLLED BY A STOP SIGN. THUS, ABOUT 50% OF ALL PEDESTRIAN COLLISIONS OCCURED UNDER CONDITIONS WHERE THE PEDESTRIAN SHOULD HAVE HAD RIGHT-OF-WAY.



Exhibit 4.8

DRIVER ACTION IN PEDESTRIAN COLLISIONS

ACTION	NUMBER OF DRIVERS INVOLVED	PERCENTAGE
DRIVING PROPERLY	214	66.0%
FOLLOWING TOO CLOSE	0	0.0%
EXCEEDING SPEED LIMIT	2	0.6%
SPEED TOO FAST FOR CONDITIONS	1	0.3%
SPEED TOO SLOW	0	0.0%
IMPROPER TURN	6	1.9%
DISOBEYED TRAFFIC CONTROL	10	3.1%
FAILED TO YIELD R.O.W.	69	21.3%
IMPROPER PASSING	0	0.0%
LOST CONTROL	6	1.9%
WRONG WAY ON ONE-WAY	0	0.0%
IMPROPER LANE CHANGE	0	0.0%
OTHER	16	4.9%
TOTAL *	324	100.0%

66% OF THE MOTOR VEHICLE DRIVERS INVOLVED IN PEDESTRIAN COLLISIONS WERE RECORDED AS DRIVING PROPERLY.

THE MOST FREQUENTLY RECORDED IMPROPER DRIVER ACTION WAS FAILURE TO YIELD THE RIGHT-OF-WAY.

* Pedestrian collisions involved more than one driver or vehicle in some cases. Data not available on driver action in 10 cases.



Exhibit 4.9

PEDESTRIAN AGE VS INJURY STATUS

PEDESTRIAN AGE	STATUS OF INJURY					TOTAL	% MAJOR OR FATAL INJURY
	NONE	MINIMAL	MINOR	MAJOR	FATAL		
0-4	1	3	5	1	1	11	18.2%
5-9	1	22	22	4	0	49	8.2%
10-14	0	20	25	4	0	49	8.2%
15-19	1	23	23	2	0	49	4.1%
20-24	1	10	6	3	0	20	15.0%
25-34	2	23	20	4	1	50	10.0%
35-44	1	7	21	4	1	34	14.7%
45-54	0	6	11	0	1	18	5.6%
55-64	0	8	9	0	2	19	10.5%
65-74	0	6	12	3	2	23	21.7%
75-98	1	9	5	1	2	18	16.7%
UNKNOWN	2	5	2	1	0	10	10.0%
TOTAL	10	142	161	27	10	350	10.6%
%	2.9%	40.6%	46.0%	7.7%	2.9%	100.0%	

OF ALL PEDESTRIANS INVOLVED IN COLLISIONS, 90%
SUFFERED NO INJURY OR ONLY MINIMAL OR MINOR INJURIES.



1991 Hamilton-Wentworth Collision Report

Exhibit A.2

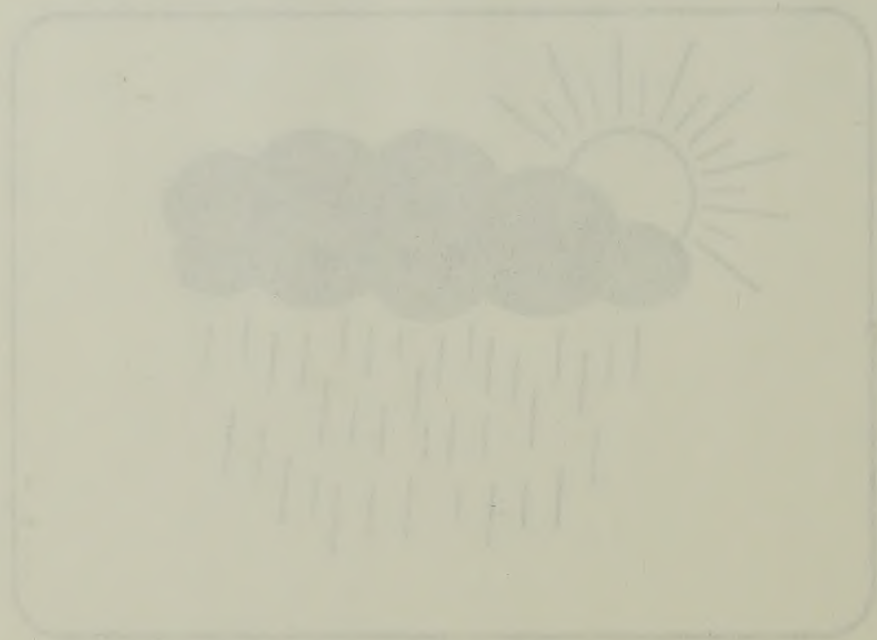
PEDESTRIANS INVOLVED IN COLLISIONS BY STATUS AND INJURY STATUS

PEDESTRIAN		STATUS		INJURY STATUS		TOTAL	
AGE	SEX	STATUS	INJURY STATUS	STATUS	INJURY STATUS	TOTAL	INJURY STATUS
0-4							
5-9							
10-14							
15-19							
20-24							
25-29							
30-34							
35-39							
40-44							
45-49							
50-54							
55-59							
60-64							
65-69							
70-74							
75-79							
80-84							
85-89							
90-94							
95-99							
TOTAL							

OF ALL PEDESTRIANS INVOLVED IN COLLISIONS, 10% SUFFERED NO INJURY OR ONLY MINOR INJURY, 90% SUFFERED MODERATE OR SEVERE INJURY.



Chapter Five Environment



Chapter Five Environment



Chapter 5

Weather and Light Conditions

Exhibit 5.1 indicates that most collisions occurred during clear weather conditions and under daylight conditions.

Road Surface

An estimated 70 percent of collisions occurred under dry pavement conditions (Exhibit 5.2).

Pavement Markings

As shown in Exhibit 5.3, 83 percent of collisions occurred on roadways where the pavement markings were visible. It is important to note that pavement markings that are not visible to the driver are not necessarily associated with collision cause. Further analysis would be necessary to indicate whether or not there was a causal relationship.

Road Characteristics

The majority of collisions occurred at locations with straight, level geometrics (Exhibit 5.4). Exhibit 5.5 shows that most collisions (both non-intersection and intersection) occurred on two-way, undivided roads.

Normalizing data such as the percentages of various categories of intersections and the traffic volumes passing through those intersections is not presently available, therefore it is not possible to state that one intersection type is less prone to collision occurrence than another. However, the reader is referred to Exhibit 6.2 and Exhibit 6.3 which rank intersections by the number of collisions and rate of collision occurrence.



Road Location

Exhibit 5.6 indicates that the greatest number of collisions occurred at non-intersection locations. If collisions occurring near or at intersections are combined, there were a greater number of collisions directly or indirectly related to intersections. As the exposure to vehicle conflicts is inherently greater at intersection locations, this result is not unexpected.

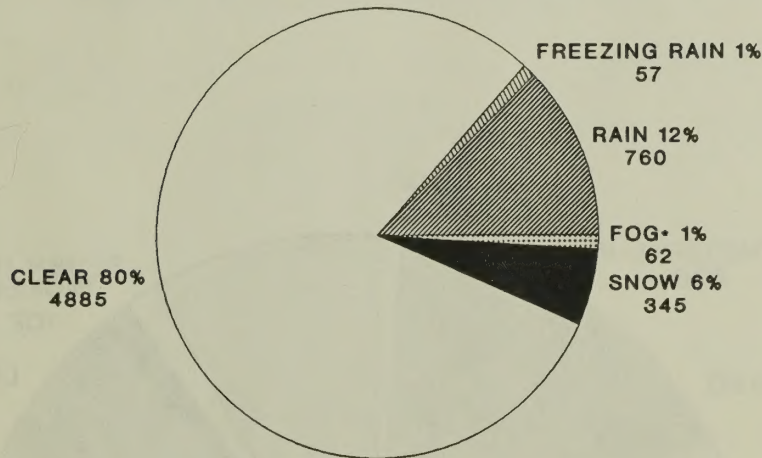
Fixed Objects

There were 384 recorded cases where vehicles struck fixed objects adjacent to the road (Exhibit 5.7). Drivers were most likely to strike utility poles or curbs. 384 cases is significantly lower than the 1985 statistic of 1,060 cases. It is uncertain as to the exact reason for this difference. Further study is necessary to determine whether these figures are due to reporting dollar levels or due to changes in insurance or are in fact because less objects are being struck.

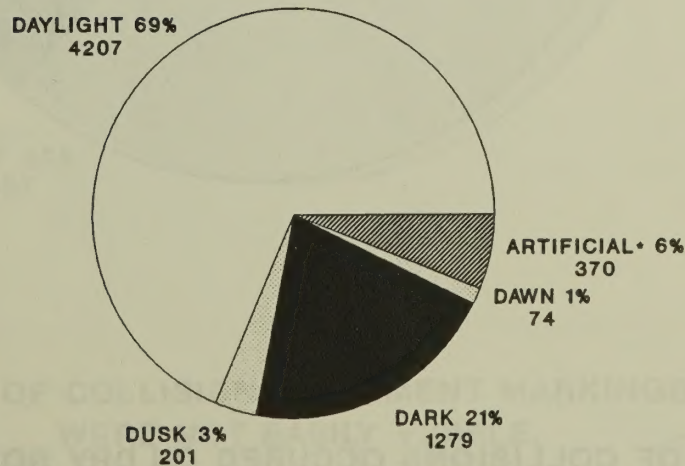


Exhibit 5.1

WEATHER AND LIGHT CONDITIONS IN MOTOR VEHICLE COLLISIONS



• INCLUDES FOG, MIST, SMOKE AND DUST



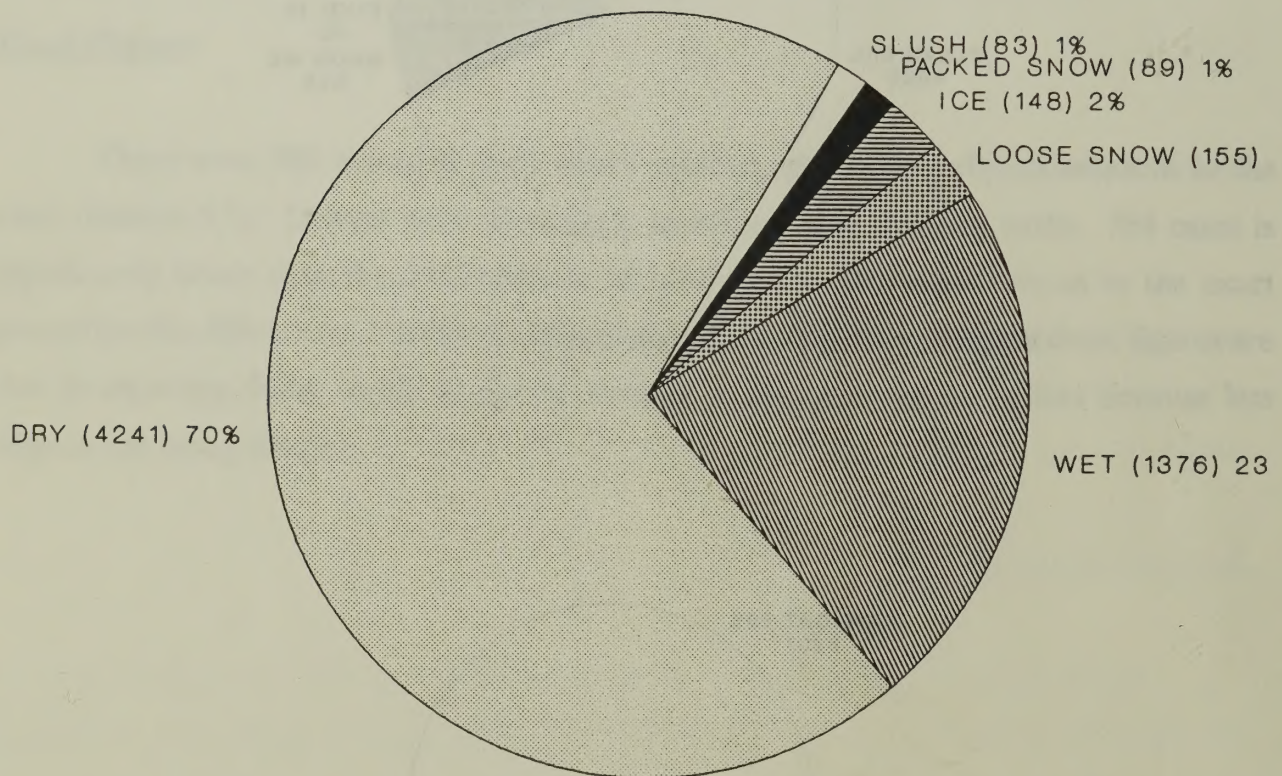
• INCLUDES ARTIFICIAL DAYLIGHT, DAWN, DUSK AND DARK

80% OF COLLISIONS OCCURRED DURING CLEAR WEATHER.
69% OF COLLISIONS OCCURRED IN DAYLIGHT.



Exhibit 5.2

ROAD SURFACE CONDITIONS IN MOTOR VEHICLE COLLISIONS

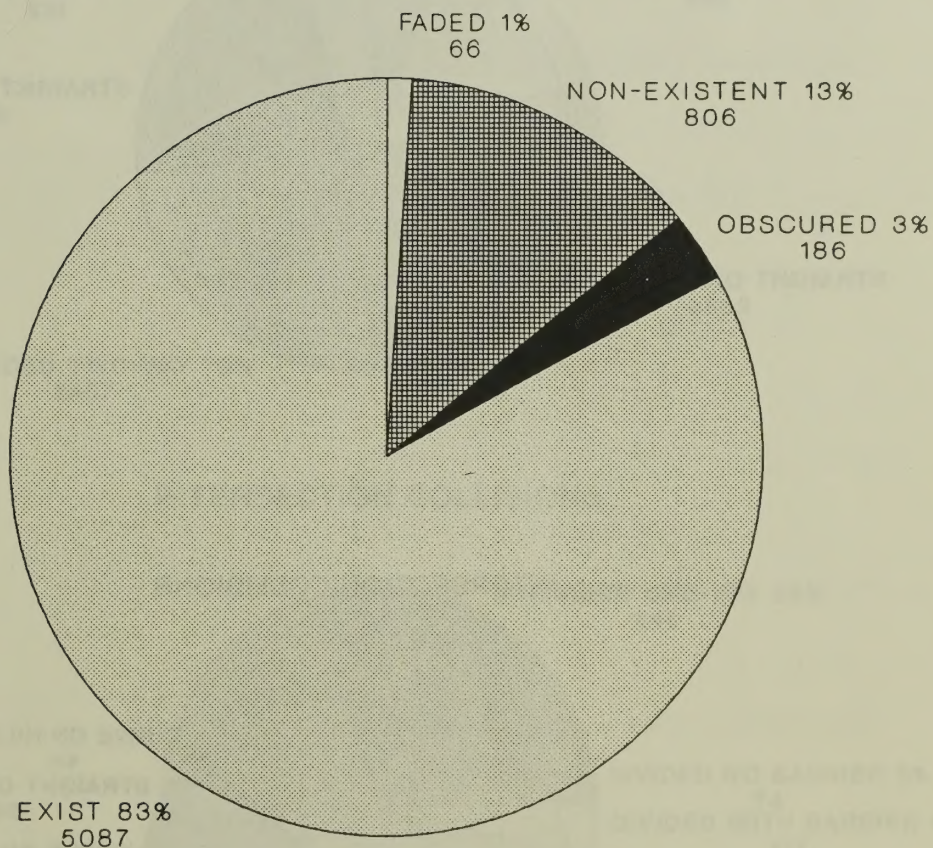


70% OF COLLISIONS OCCURED ON DRY ROAD SURFACES.



Exhibit 5.3

PAVEMENT MARKINGS IN MOTOR VEHICLE COLLISIONS

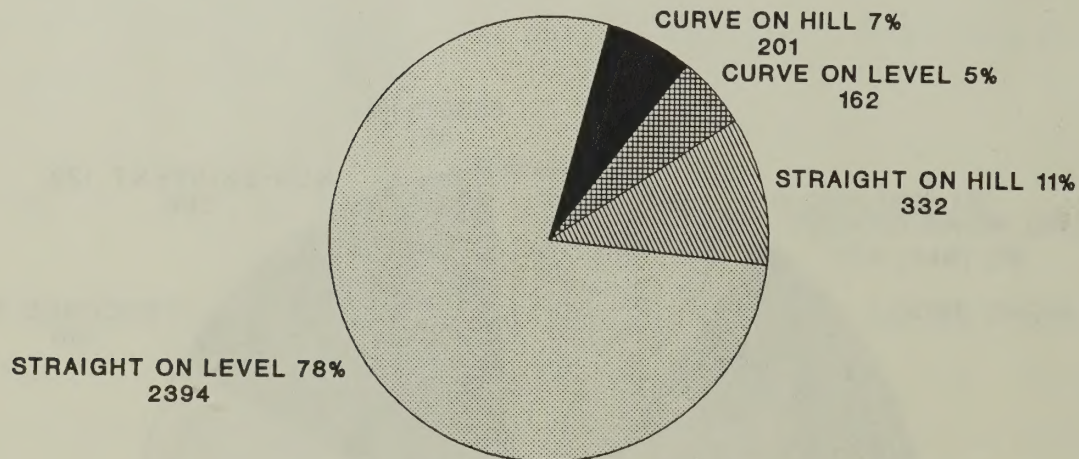


**IN 17% OF COLLISIONS, PAVEMENT MARKINGS
WERE NOT EASILY VISIBLE.**

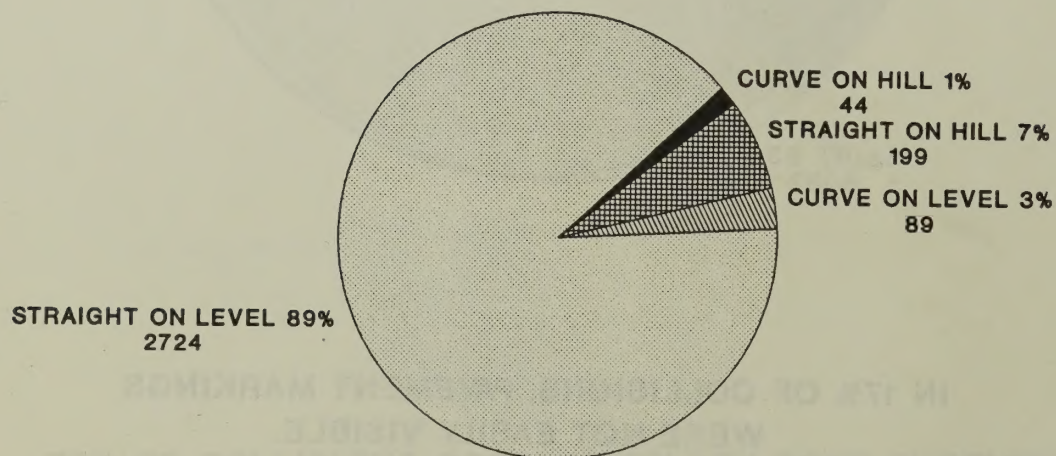


Exhibit 5.4 ROAD ALIGNMENT IN MOTOR VEHICLE COLLISIONS

NON-INTERSECTION COLLISIONS



INTERSECTION COLLISIONS



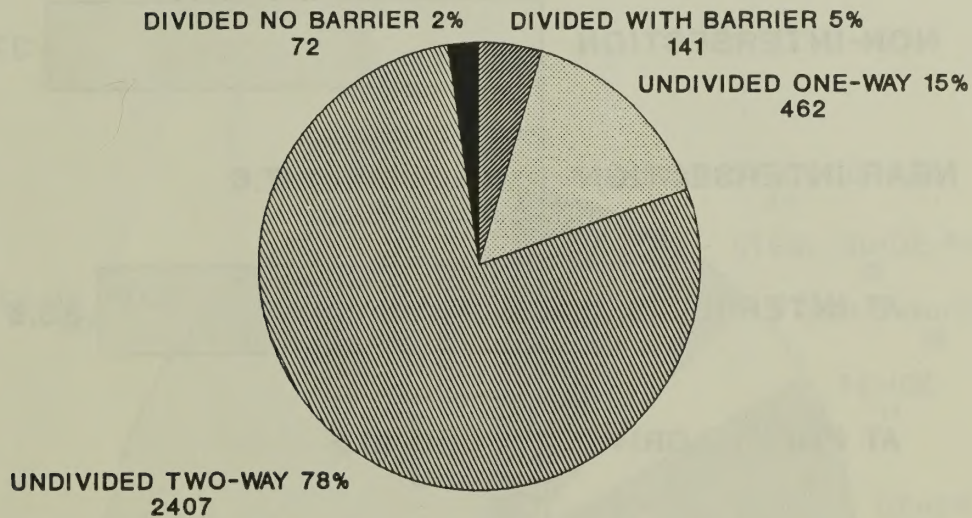
**MOST COLLISIONS OCCURRED AT LOCATIONS WITH
STRAIGHT, LEVEL GEOMETRICS.**



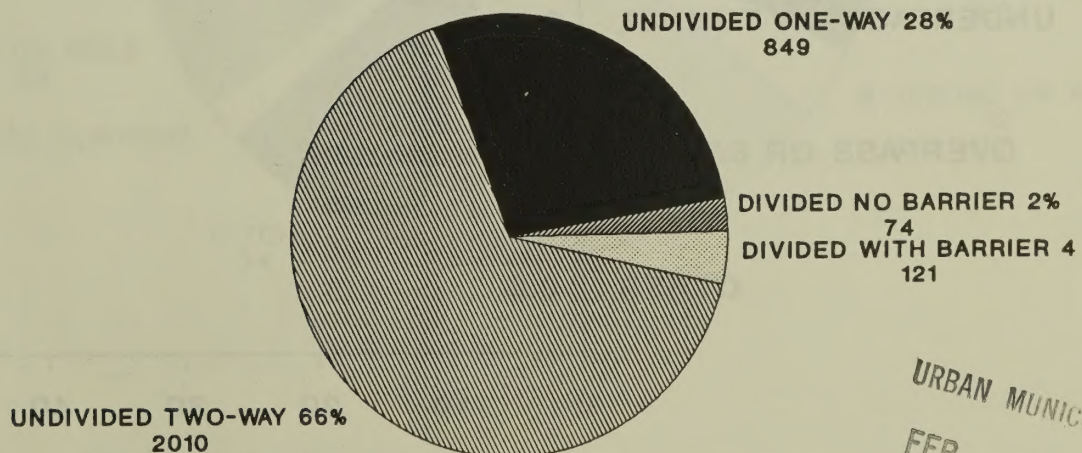
Exhibit 5.5

ROAD CHARACTERISTICS IN MOTOR VEHICLE COLLISIONS

NON-INTERSECTION COLLISIONS



INTERSECTION COLLISIONS

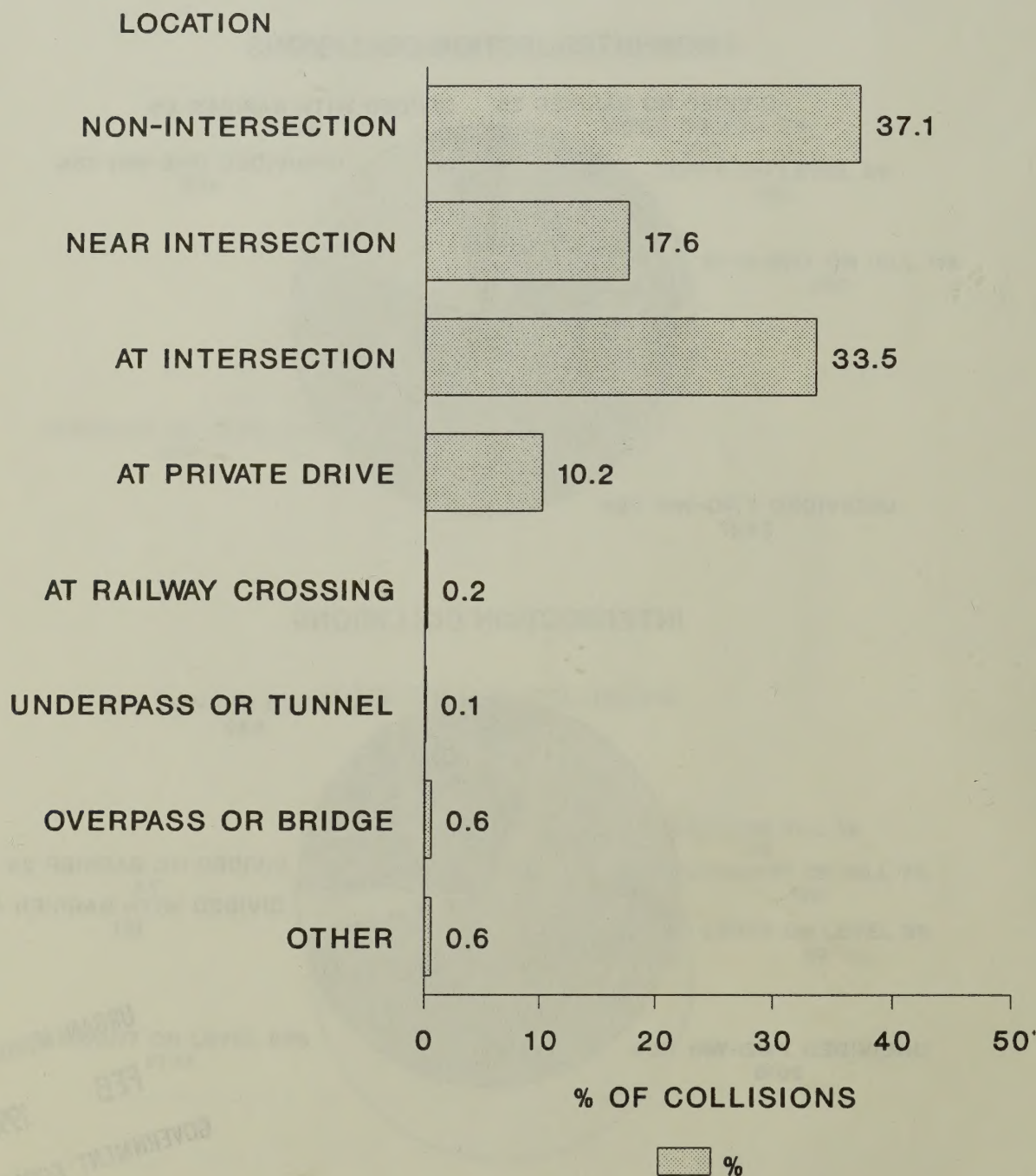


**MOST COLLISIONS OCCURRED ON UNDIVIDED
TWO WAY ROADS**

URBAN MUNICIPAL
FEB 1993
GOVERNMENT DOCUMENTS



Exhibit 5.6 LOCATION OF COLLISIONS

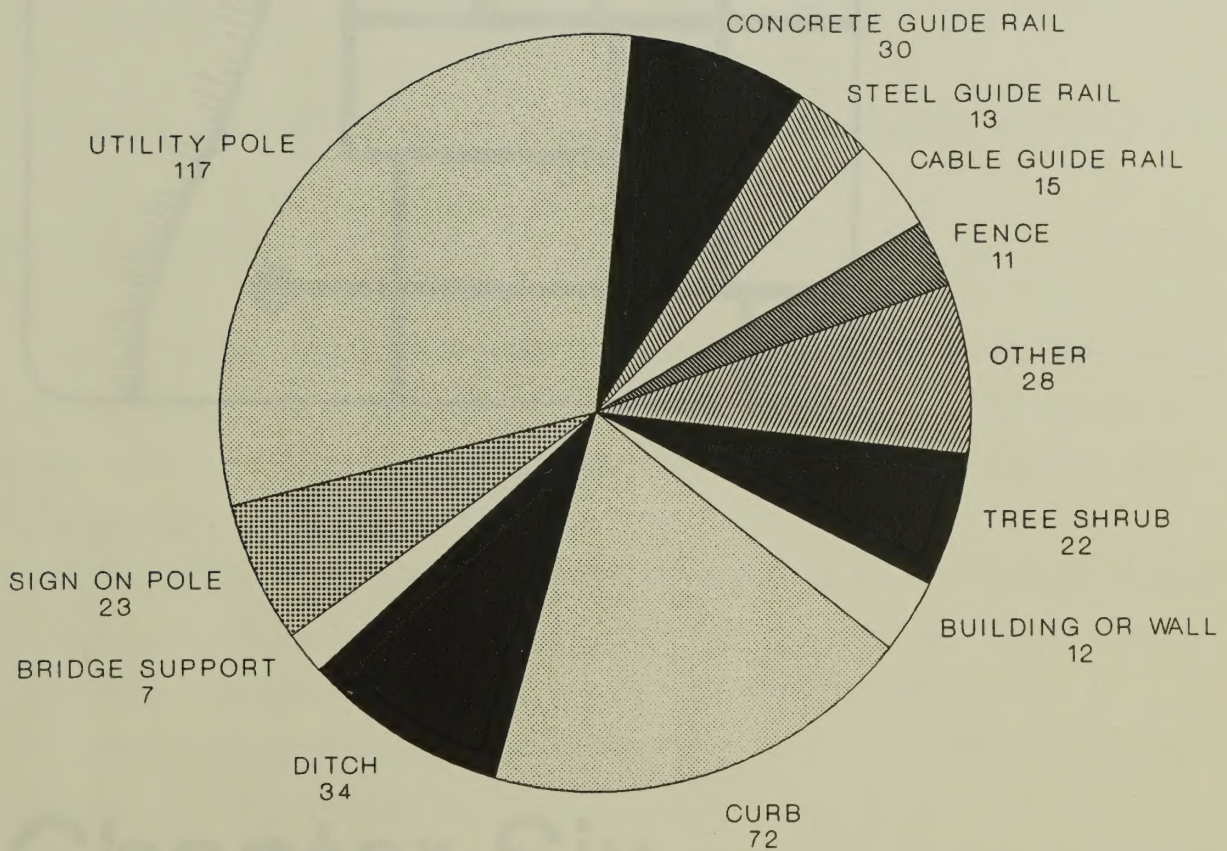


THE LARGEST NUMBER OF COLLISIONS
OCCURRED IN, OR NEAR INTERSECTIONS



Exhibit 5.7

TYPES OF FIXED OBJECTS STRUCK IN MOTOR VEHICLE COLLISIONS

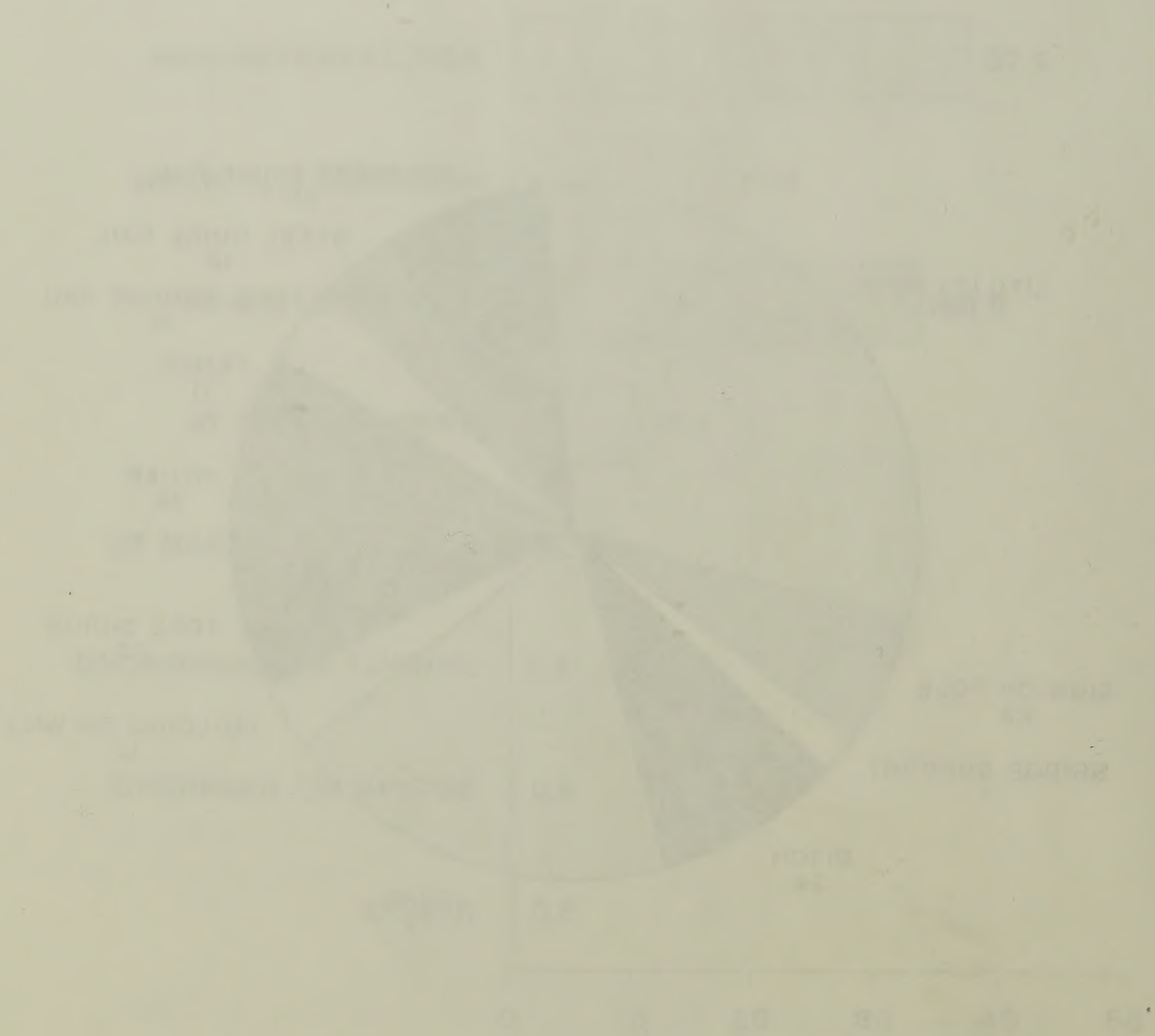


**DRIVERS HITTING FIXED OBJECTS ARE MOST LIKELY TO
STRIKE UTILITY POLES OR CURBS.**



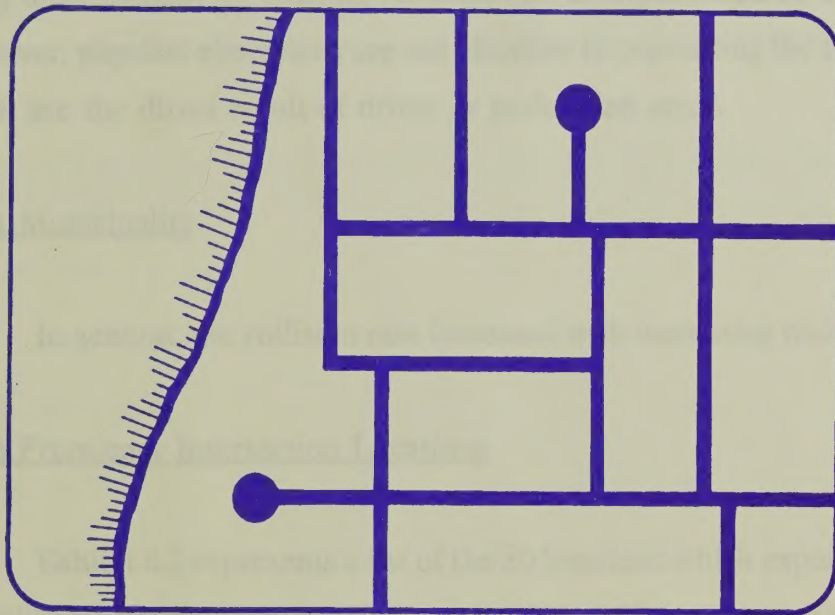
1991 Hamilton-Wentworth Collision Report

Exhibit 8.7
TYPES OF FIXED OBJECTS STRUCK
IN MOTOR VEHICLE COLLISIONS



DRIVERS HITTING FIXED OBJECTS ARE MOST LIKELY TO
STRIKE UTILITY POLES OR CURBS.

THE LARGEST NUMBER OF COLLISIONS
OCCURRED IN OR NEAR INTERSECTIONS



Chapter Six

Locations



Chapter Six Locations



Chapter 6

General

Locations that have high numbers or rates of collision occurrences have received regular attention by roadway authorities in the Region and countermeasures are constantly being implemented for existing facilities and incorporated into the design of new facilities. However, physical alterations are not effective in preventing the majority of traffic collisions which are the direct result of driver or pedestrian error.

Area Municipality

In general, the collision rate increased with increasing municipality size (Exhibit 6.1).

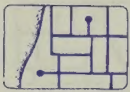
High Frequency Intersection Locations

Exhibit 6.2 represents a list of the 50 locations which experienced the highest number of collision occurrences in 1991. All 1991 collisions occurring at traffic signals were subjected to the control chart analysis technique (Exhibit 6.3). Exhibit 6.2 also provides a five year average for each intersection.

These exhibits do not necessarily represent priority list for improvements as other factors have to be taken into account such as cost-benefit considerations or the deployment of other collision countermeasures which may be more cost-effective.

In many cases, these locations are already under consideration for various forms of improvement on a priority basis.

Exhibits 6.4, 6.5 and 6.6 provide data on rates of collision occurrence on roadway sections, showing the 25 sections of major roadway with the highest rates. Exhibit 6.4 shows rates calculated including all collisions on the roadway sections. Exhibit 6.5 shows rates which include collisions at unsignalized intersections but exclude collisions at signalized intersections. Exhibit 6.6 shows rates which are calculated excluding any collisions occurring within 9 m of an intersection (signalized or unsignalized).



Comparison of Hamilton and Hamilton-Wentworth with other Cities

On the basis of total collisions per 1000 population, Hamilton and Hamilton-Wentworth are very close to the lowest rates in Canada (Exhibit 6.7). On the basis of injury collisions per 1000 population, the City and Region are substantially better than average.

On the basis of fatal collisions per 100,000 population (Exhibit 6.8) Hamilton has one of the best records of cities of similar size in North America.



Exhibit 6.1

COLLISIONS VS AREA MUNICIPALITY

MUNICIPALITY	CLASS OF COLLISION (a)				1991 COLLISIONS RATE PER 1,000 POP.(c)
	FATAL	NON- FATAL INJURY	PROPERTY DAMAGE ONLY	ALL COLLISIONS (b)	
ANCASTER	1	86	121	208	10.4
DUNDAS	0	66	121	187	8.9
FLAMBOROUGH	2	84	156	242	8.8
GLANBROOK	1	40	69	110	11.4
CITY OF HAMILTON	16	1846	3038	4900	15.7
STONEY CREEK	5	203	277	485	10.5
TOTAL FOR THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH	25	2325	3782	6132	14.0

(a) Collisions reported to the Hamilton-Wentworth Regional Police only; areas patrolled by the Provincial Police (e.g. Kings Highways) are not included.

(b) Location data missing from a small number of collisions.

(c) Population figure extrapolated based on 1988 population data for each municipality.

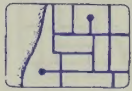
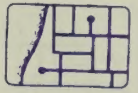


Exhibit 6.2

INTERSECTIONS WITH THE HIGHEST NUMBER OF
COLLISIONS IN 1991 (a)

	INTERSECTION	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5 YEAR AVERAGE
1	MAIN & DUNDURN	TRAFFIC SIGNAL	26	21.6
2	FENNELL & GARTH	TRAFFIC SIGNAL	18	16.6
3	MAIN & BAY	TRAFFIC SIGNAL	16	24.0
4	MOHAWK & UPPER OTTAWA	TRAFFIC SIGNAL	16	22.2
5	YORK & HESS	TRAFFIC SIGNAL	16	10.2
6	ABERDEEN & DUNDURN	TRAFFIC SIGNAL	14	12.2
7	KING & DUNDURN	TRAFFIC SIGNAL	14	19.4
8	MOHAWK & UPPER JAMES	TRAFFIC SIGNAL	14	14.8
9	QUEENSTON & CENTENNIAL	TRAFFIC SIGNAL	14	21.8
10	BURLINGTON & GAGE	TRAFFIC SIGNAL	12	10.0
11	LIMERIDGE & UPPER WENTWORTH	TRAFFIC SIGNAL	12	10.2
12	MAIN & WELLINGTON	TRAFFIC SIGNAL	12	12.8
13	CHARLTON & SHERMAN ACCESS	TRAFFIC SIGNAL	11	11.0
14	LIMERIDGE & UPPER JAMES	TRAFFIC SIGNAL	11	11.6
15	MAIN & JAMES	TRAFFIC SIGNAL	11	8.4
16	MAIN & LONGWOOD	TRAFFIC SIGNAL	11	10.4
17	WILSON & JOHN	TRAFFIC SIGNAL	11	12.0
18	KENILWORTH ACCESS & MOUNTAIN BROW	TRAFFIC CIRCLE	11	5.4
19	BURLINGTON & WENTWORTH	TRAFFIC SIGNAL	10	8.4
20	CHARLTON & JOHN	TRAFFIC SIGNAL	10	7.6
21	FENNELL & UPPER JAMES	TRAFFIC SIGNAL	10	7.6
22	FENNELL & UPPER WENTWORTH	TRAFFIC SIGNAL	10	7.4



INTERSECTION	TYPE OF TRAFFIC CONTROL	NUMBER OF COLLISIONS	5 YEAR AVERAGE
23 KING & CENTENNIAL	TRAFFIC SIGNAL	10	14.4
24 KING & VICTORIA	TRAFFIC SIGNAL	10	10.4
25 KING & JAMES	TRAFFIC SIGNAL	10	10.4
26 MOHAWK & UPPER GAGE	TRAFFIC SIGNAL	10	7.2
27 QUEENSTON & NASH	TRAFFIC SIGNAL	10	14.6
28 YORK & LOCKE	TRAFFIC SIGNAL	10	11.4
29 KENILWORTH ACCES & SHERMAN ACCESS	E/W STOP, YIELD	10	12.8
30 HUGHSON & KING WILLIAM	N/B STOP SIGN	10	6.0
31 BARTON & CENTENNIAL	TRAFFIC SIGNAL	9	14.2
32 BARTON & GAGE	TRAFFIC SIGNAL	9	11.8
33 BRANTDALE & UPPER JAMES	TRAFFIC SIGNAL	9	4.6
34 BURLINGTON & KENILWORTH	TRAFFIC SIGNAL	9	6.2
35 CANNON & KENILWORTH	TRAFFIC SIGNAL	9	9.0
36 CANNON & JAMES	TRAFFIC SIGNAL	9	9.6
37 CHARLTON & QUEEN	TRAFFIC SIGNAL	9	7.2
38 KING & GAGE	TRAFFIC SIGNAL	9	6.4
39 KING & PARKDALE	TRAFFIC SIGNAL	9	13.2
40 MAIN & VICTORIA	TRAFFIC SIGNAL	9	15.6
41 MAIN & CAROLINE	TRAFFIC SIGNAL	9	8.8
42 MAIN & LOCKE	TRAFFIC SIGNAL	9	9.2
43 ROXBOROUGH & PARKDALE	TRAFFIC SIGNAL	9	8.0
44 YORK & BAY	TRAFFIC SIGNAL	9	5.6
45 BARTON & JOHN	TRAFFIC SIGNAL	8	9.0
46 CHARLTON & JAMES	TRAFFIC SIGNAL	8	7.4
47 CHARLTON & HESS	TRAFFIC SIGNAL	8	7.6
48 COOTES & OLYMPIC	TRAFFIC SIGNAL	8	7.6
49 JACKSON & JOHN	TRAFFIC SIGNAL	8	6.4
50 KING & CAROLINE	TRAFFIC SIGNAL	8	9.8

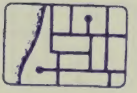
(a) Only collisions occurring within 31 feet (9.5 m) of the intersection are defined as being "in" the intersection and are included in this list.



Exhibit 6.3

SIGNALIZED INTERSECTIONS WITH THE HIGHEST COLLISION RATES IN 1991

INTERSECTION	RL (a)	RC (b)	RL/RC	1990 AWDT (c)	NUMBER OF COLLISIONS				5 YR AVG.	COMMENTS
					1987	1988	1989	1990		
1 HUNTER ST E & CATHARINE ST S	3.4	1.2	2.8	12397	23	18	19	2	3	13.0 (d)
2 MOHAWK RD E & UPPER OTTAWA ST	2.4	1.0	2.3	28066	22	25	30	18	16	22.2 (e)
3 CHARLTON AVE W & HESS ST S	2.0	1.2	1.7	11201	10	7	7	6	8	7.6
4 MAIN ST E & JOHN ST S	1.8	1.0	1.9	41203	28	35	34	29	7	26.6 (f)
5 QUEENSDALE AVE & UPPER GAGE	1.8	1.2	1.6	12980	11	11	9	8	3	8.4 (g)
6 FENNEL AVE E & UPPER OTTAWA ST	1.6	1.0	1.5	29022	16	23	22	8	3	14.4 (h)
7 CHARLTON AVE E & SHERMAN ACCESS	1.5	1.1	1.4	21040	11	17	9	7	11	11.0
8 WILSON ST E & JOHN ST N	1.5	1.1	1.4	23950	10	15	14	10	11	12.0
9 CANNON ST E & GAGE AVE N	1.4	1.0	1.4	25248	13	15	14	17	4	12.6
10 MAIN ST W & BAY ST S	1.4	0.9	1.5	43207	28	36	25	15	16	24.0 (f)
11 BRAMPTON ST & WOODWARD AVE	1.4	1.2	1.2	12948	6	6	8	7	6	6.6 (h)
12 BARTON ST E & JOHN ST N	1.4	1.1	1.2	20217	8	13	10	6	8	9.0
13 LIMERIDGE RD W & GARTH ST	1.4	1.1	1.2	24134	11	6	6	18	8	9.8
14 QUEENSDALE AVE & UPPER WENTWORTH	1.3	1.2	1.1	12980	6	6	16	1	2	6.2
15 YORK BLVD & HESS ST N	1.3	1.1	1.2	20755	7	7	11	10	16	10.2
16 ABERDEEN AVE & DUNDURN ST S	1.3	1.0	1.2	30674	17	13	6	11	14	12.2
17 FENNEL AVE W & GARTH ST	1.3	1.0	1.3	37118	10	23	20	12	18	16.6 (i)
18 HUNTER ST W & HESS ST S	1.3	1.2	1.0	10443	6	6	5	2	3	4.4
19 KING ST E & PARKDALE AVE N	1.3	1.0	1.2	32463	16	19	15	7	9	13.2
20 MAIN ST W & DUNDURN ST S	1.2	0.9	1.3	48628	21	18	26	17	26	21.6
21 CANNON ST W & HESS ST N	1.2	1.0	1.2	23320	18	14	4	12	4	10.4
22 CHARLTON AVE W & QUEEN ST S	1.2	1.1	1.1	16076	6	5	9	7	9	7.2
23 LIMERIDGE RD E & UPPER WENTWORTH	1.2	1.1	1.1	24105	7	5	15	12	5	8.8
24 KING ST & JAMES ST	1.2	1.0	1.2	26413	9	16	12	10	9	11.2



INTERSECTION	NUMBER OF COLLISIONS										1990 AWDT (c)	RL (a)	RC (b)	RL/RC	5 YR AVG. COMMENTS
	1987	1988	1989	1990	1991										
25 BARTON ST E & GAGE AVE N	16	15	13	6	9	30198	1.2	1.0	1.2	1.2	1.2	1.0	1.2	11.8	
26 QUEENSTON RD & CENTENNIAL PKWY	25	30	20	20	14	54412	1.2	0.9	1.2	1.2	1.2	0.9	1.2	21.8	
27 KENTLEY DR & NASH RD N	3	4	5	8	6	13178	1.0	1.2	1.0	1.1	1.0	1.2	1.0	5.2	
28 QUEENSTON RD & NASH RD	25	13	17	8	10	36779	1.1	1.0	1.1	1.1	1.1	1.0	1.1	14.6	
29 KING ST W & DUNDURN ST	20	29	18	16	14	47961	1.2	0.9	1.2	1.2	1.2	0.9	1.2	19.4	
30 BURLINGTON ST E & GAGE AVE N	11	6	15	6	12	24443	1.1	1.0	1.1	1.1	1.1	1.0	1.1	10.0	
31 LIMERIDGE RD E & UPPER GAGE AVE	7	11	12	10	8	26854	1.1	1.0	1.1	1.1	1.1	1.0	1.1	9.6	
32 KING WILLIAM ST & JAMES ST N	0	4	0	2	2	0	0.8	1.4	0.8	0.8	0.8	1.4	0.8	1.6	
33 MELVIN AVE & PARKDALE AVE N	11	11	9	9	5	25953	1.0	1.1	1.0	1.0	1.0	1.1	1.0	9.0	
34 BARTON ST W & BAY ST N	2	9	4	5	3	12862	0.9	1.2	0.9	0.9	0.9	1.2	0.9	4.6	
35 BARTON ST E & WOODWARD AVE	12	16	19	6	6	31856	1.1	1.0	1.1	1.1	1.1	1.0	1.1	11.8	
36 MAIN ST E & VICTORIA AVE	21	20	19	9	9	41004	1.1	1.0	1.1	1.1	1.1	1.0	1.1	15.6	
37 BRAMPTON ST & PARKDALE AVE N	6	10	8	6	6	19069	1.0	1.1	1.0	1.0	1.0	1.1	1.0	7.2	
38 GOVERNORS RD & OGILVIE (DUN)	6	4	8	8	3	17751	0.9	1.1	0.9	0.9	0.9	1.1	0.9	5.8	
39 ROXBOROUGH AVE & PARKDALE AVE N	9	9	10	3	9	23568	1.0	1.1	1.0	1.0	1.0	1.1	1.0	8.0	
40 CANNON ST E & OTTAWA ST N	6	15	11	5	6	21412	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8.6	
41 LIMERIDGE RD & UPPER JAMES ST	11	13	15	8	11	36008	1.0	1.0	1.0	1.0	1.0	1.0	1.0	11.6	
42 BARTON ST E & VICTORIA ST N	13	13	9	9	2	27955	1.0	1.0	1.0	1.0	1.0	1.0	1.0	9.2	
43 CANNON ST & JAMES ST N	7	11	10	11	9	28207	1.0	1.0	1.0	1.0	1.0	1.0	1.0	9.6	
44 BARTON ST E & WENTWORTH ST N	13	12	7	7	6	28346	1.0	1.0	0.9	0.9	0.9	1.0	0.9	9.0	
45 BARTON ST E & WELLINGTON ST N	12	13	12	3	5	26045	1.0	1.0	0.9	0.9	0.9	1.0	0.9	9.0	
46 HUNTER ST W & CAROLINE ST S	1	1	7	1	3	8171	1.0	1.3	0.8	0.8	0.8	1.0	1.3	2.6	
47 COOTES DR & OLYMPIC DR	10	8	6	6	8	19378	1.0	1.1	0.9	0.9	0.9	1.0	1.1	7.6	
48 LAWRENCE RD & ROSEDALE AVE	5	5	1	3	6	12595	0.9	1.2	0.8	0.8	0.8	0.9	1.2	4.0	
49 HUNTER ST W & BAY ST S	5	2	8	7	4	14740	0.9	1.1	0.8	0.8	0.8	0.9	1.1	5.2	
50 MUD ST & MOUNT ALBION	7	5	5	6	3	23094	0.9	1.1	0.8	0.8	0.8	0.9	1.1	5.2	
OVERALL (ALL 322 SIGNALIZED INTERSECTIONS IN HAMILTON-WENTWORTH)													0.6	5.6	



Notes:

- (a) RL is the number of collisions, per million vehicles entering the intersection, occurring within 31 feet of an individual intersection.
- (b) RC is a volume-adjusted critical rate. If RL exceeds RC (ie. RL/RC is greater than 1.0), one can state with 95 percent confidence that the collision rate at the intersection in question is significantly higher than would normally be expected.

$$RC = Ra + K(\text{the square root of: } (Ra/m)) - (0.5/m)$$

Where: Ra = systemwide average collision rate for all traffic signal locations
(0.72 collisions per million vehicle entries)

K = constant (=1.65 for 95 % confidence level)

m = vehicle exposure at the location in million vehicles
entering per year (AWDTx346.9/1,000,000)

- (c) AWDT - Average Weekday Daily Traffic (total vehicles entering the intersection).

REGARDING SPECIFIC INTERSECTIONS:

- (d) Signalized in 1990 - collision rate has been greatly reduced.
- (e) To be reconstructed in 1993 to provide channelized left turn lanes.
- (f) Intersection provided with physical barriers to discourage illegal northbound movements in "must turn lane" in 1991.
- (g) Reconstructed to provide left turn channelization in 1991 - collision rate has been greatly reduced.
- (h) Left turn protected phasing to be installed in 1992.
- (i) Left turn lanes painted in 1990.

ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1991

CITY OF HAMILTON ARTERIALS

(ALL INTERSECTIONS INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. JAMES ST	BARTON ST	MURRAY ST	26.0	27.08	9.22	2.94	.120	5786	0.24
2. DALEWOOD AV	KING ST	MAIN ST	8.0	20.00	10.14	1.97	.220	1313	0.10
3. CANNON ST	GAGE AV	OTTAWA ST	155.0	19.18	6.47	2.96	.866	6688	2.02
4. JAMES ST	KING N BRANCH	BARTON ST	161.0	13.88	6.15	2.26	.860	9634	2.90
5. CANNON ST	SHERMAN AV	GAGE AV	136.0	13.18	6.25	2.11	.891	8278	2.58
6. KING ST	QUEEN ST	JAMES ST	309.0	11.76	5.57	2.11	.860	21842	6.57
7. JOHN ST	ST. JOSEPH'S DR	KING N BRANCH	247.0	11.59	5.70	2.03	.976	15613	5.33
8. QUEENSTON RD	NASH RD	REGIONAL LIMITS	148.0	11.49	6.06	1.90	.823	11175	3.22
9. CHARLTON AV	QUEEN ST	JAMES ST	93.0	11.23	6.45	1.74	.823	7211	2.07
10. BAY ST	KING ST	CANNON ST	66.0	10.78	6.75	1.60	.450	9702	1.53
11. MAIN ST	OTTAWA ST	KENILWORTH AV	174.0	10.74	5.89	1.82	.836	13845	4.05
12. BAY ST	HERKIMER ST	KING ST	143.0	10.10	5.99	1.69	.924	10950	3.54
13. STINSON ST	VICTORIA AV	WENTWORTH ST	41.0	9.86	7.19	1.37	.665	4473	1.04
14. BARTON ST	GAGE AV	OTTAWA ST	226.0	9.76	5.65	1.73	.860	19256	5.79
15. CANNON ST	OTTAWA ST	BARONS AV	106.0	9.53	6.19	1.54	1.190	6688	2.78
16. CHARLTON AV	JAMES ST	JOHN ST	28.0	9.33	7.60	1.23	.244	8840	0.75
17. KING ST	WELLINGTON ST	WENTWORTH ST	273.0	9.09	5.49	1.66	.866	24800	7.51
18. KING ST	CATHARINE ST	WELLINGTON ST	129.0	8.79	5.96	1.47	.531	19748	3.67
19. KING ST	GAGE AV	MAIN ST	98.0	8.66	6.17	1.40	.610	13281	2.83
20. MAIN ST	KING ST	OTTAWA ST	120.0	8.60	6.00	1.43	.366	27254	3.49
21. MAIN ST	JAMES ST	WELLINGTON ST	283.0	8.59	5.44	1.58	.866	27208	8.24
22. BARTON ST	WELLINGTON ST	WENTWORTH AV	180.0	8.47	5.70	1.49	.872	17414	5.31
23. BARTON ST	JAMES ST	WELLINGTON ST	145.0	8.43	5.85	1.44	.836	14711	4.30
24. JAMES ST	ST. JOSEPH'S DR	KING ST N BRANCH	186.0	8.29	5.67	1.46	.968	16578	5.61
25. YORK BL	QUEEN ST	JAMES ST	147.0	8.28	5.82	1.42	.921	13784	4.44
ALL CITY OF HAMILTON ARTERIAL STREETS				4.31					

(a) Please refer to Notes on Page 78.



**Notes:** Re: Collision Rates on Roadway Sections

1. Exhibit 6.4 includes all collisions on an arterial roadway section. If the roadway section ends at an intersection, signalized or unsignalized, one-half the number of collisions occurring at the intersection is included.
2. Exhibit 6.5 includes all collisions on an arterial roadway section excluding those which occur within nine metres of a signalized intersection. If the roadway section ends at an unsignalized intersection, one-half the number of collisions occurring at the intersection is included.
3. Exhibit 6.6 includes only collisions on an arterial roadway section which occur greater than nine metres from any intersection. That is, no collisions referenced to an intersection, signalized or unsignalized, are included.
4. R_L is the collision rate for the roadway section expressed as collisions per million vehicle kilometres travelled per annum.
5. R_C is a volume-adjusted critical rate. If R_L exceeds R_C (i.e. R_L is greater than 1.00), one can state with 95 percent confidence that the collision rate for the roadway section in question is significantly higher than would normally be expected.

$$R_C = R_a + K \sqrt{\frac{R_a}{m} - \frac{0.5}{m}}$$

where R_a =

systemwide average collision rate for all roadway sections (4.31 collisions per million vehicle kilometres in 1988-1991 for Exhibit 6-4; 2.49 collisions per million vehicle kilometres in 1988-1991 for Exhibit 6-5; 1.58 collisions per million vehicle kilometres in 1988-1991 for Exhibit 6-6).

K = constant = 1.65 (for 95% confidence level)

m = vehicle exposure for the individual roadway section in million vehicle kilometres per year:

$$(AWDT \times \frac{349.6}{10^6} \times \text{Section Length})$$

6. AWDT - Average Weekday Daily Traffic

ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1991

CITY OF HAMILTON ARTERIALS

(SIGNALIZED INTERSECTIONS NOT INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. DALEWOOD AV	KING ST	MAIN ST	7.0	17.50	5.72	3.06	.220	1313	0.10
2. JAMES ST	BARTON ST	MURRAY ST	13.0	13.54	5.72	2.37	.120	5786	0.24
3. CANNON ST	GAGE AV	OTTAWA ST	87.0	10.77	4.07	2.65	.866	6688	2.02
4. STINSON ST	VICTORIA AV	WENTWORTH ST	40.0	9.62	4.56	2.11	.665	4473	1.04
5. CANNON ST	SHERMAN AV	GAGE AV	93.0	9.01	3.92	2.30	.891	8278	2.58
6. MAIN ST	OTTAWA ST	KENILWORTH AV	118.0	7.28	3.66	1.99	.836	13845	4.05
7. QUEENSTON RD	NASH RD	REGIONAL LIMITS	92.0	7.14	3.79	1.88	.823	11175	3.22
8. JAMES ST	MURRAY ST	BURLINGTON ST	56.0	7.11	4.09	1.74	.890	6336	1.97
9. JAMES ST	KING ST N BRANCH	BARTON ST	81.0	6.98	3.85	1.81	.860	9634	2.90
10. BARTON ST	GAGE AV	OTTAWA ST	159.0	6.87	3.49	1.97	.860	19256	5.79
11. CHARLTON AV	QUEEN ST	JAMES ST	56.0	6.76	4.06	1.67	.823	7211	2.07
12. KING ST	QUEEN ST	JAMES ST	170.0	6.47	3.43	1.89	.860	21842	6.57
13. MAIN ST	KING ST	OTTAWA ST	90.0	6.45	3.74	1.72	.366	27254	3.49
14. KING ST	WELLINGTON ST	WENTWORTH ST	189.0	6.29	3.37	1.87	.866	24800	7.51
15. BAY ST	KING ST	CANNON ST	38.0	6.21	4.27	1.45	.450	9702	1.53
16. KING ST	GAGE AV	MAIN ST	68.0	6.01	3.86	1.56	.610	13281	2.83
17. WENTWORTH ST	BARTON ST	BURLINGTON ST	44.0	5.95	4.13	1.44	1.031	5134	1.85
18. CANNON ST	OTTAWA ST	BARONS AV	66.0	5.94	3.87	1.53	1.190	6688	2.78
19. BARTON ST	QUEEN ST	JAMES ST	70.0	5.74	3.82	1.50	.872	10004	3.05
20. CHARLTON AV	JAMES ST	JOHN ST	17.0	5.67	4.83	1.17	.244	8840	0.75
21. BARTON ST	WELLINGTON ST	WENTWORTH ST	114.0	5.37	3.52	1.53	.872	17414	5.31
22. KENILWORTH AV	KENILWORTH ACCESS	MAIN ST	101.0	5.20	3.57	1.46	.695	19991	4.86
23. OTTAWA ST	MAIN ST	BARTON ST	79.0	5.12	3.69	1.39	1.031	10718	3.86
24. MAIN ST	KENILWORTH AV	BERRY AV	117.0	4.81	3.46	1.39	.702	24768	6.08
25. KING ST	CATHARINE ST	WELLINGTON ST	73.0	4.97	3.71	1.34	.531	19748	3.67
ALL CITY OF HAMILTON ARTERIAL STREETS									



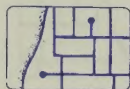


Exhibit 6.6

ROADWAY SECTIONS WITH THE HIGHEST COLLISION RATES, 1988 - 1991

CITY OF HAMILTON ARTERIALS

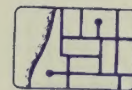
(INTERSECTIONS NOT INCLUDED) (a)

Arterial Street	From	To	Number of Collisions	R _L	R _C	Ratio	Link Length (Km)	Link Volume (AWDT)	Million Veh-Km Per Year
1. JAMES ST	BARTON ST	MURRAY ST	7.0	7.29	3.73	1.95	.120	5786	0.24
2. QUEENSTON RD	NASH RD	REGIONAL LIMITS	88.0	6.83	2.58	2.65	.823	11175	3.22
3. KING ST	QUEEN ST	JAMES ST	170.0	6.47	2.31	2.80	.860	21842	6.57
4. JAMES ST	KING ST N BRANCH	BARTON ST	53.0	4.57	2.62	1.74	.860	9634	2.90
5. CANNON ST	SHERMAN AV	GAGE AV	44.0	4.26	2.68	1.59	.891	8278	2.58
6. STINSON ST	VICTORIA AV	WENTWORTH ST	17.0	4.09	3.13	1.31	.665	4473	1.04
7. MAIN ST	OTTAWA ST	KENILWORTH AV	64.0	3.95	2.49	1.59	.836	13845	4.05
8. ST. JOSEPH'S DR	JAMES ST	JOHN ST	24.0	3.95	2.93	1.35	.256	16970	1.52
9. LIMERIDGE RD	UPPER WENTWORTH	UPPER SHERMAN	71.0	3.93	2.44	1.61	.808	15992	4.52
10. BAY ST	KING ST	CANNON ST	24.0	3.92	2.93	1.34	.450	9702	1.53
11. CANNON ST	GAGE AV	OTTAWA ST	31.0	3.84	2.79	1.38	.866	6688	2.02
12. ARKLEDUN	JOLLEY CUT	JOHN ST	36.0	3.81	2.72	1.40	.400	16892	2.36
13. MAIN ST	KING ST	OTTAWA ST	53.0	3.80	2.55	1.49	.366	27254	3.49
14. MAIN ST	PARADISE ST	DUNDURN ST	95.0	3.74	2.32	1.61	.907	20024	6.35
15. KING ST	CATHARINE ST	WELLINGTON ST	53.0	3.61	2.53	1.43	.531	19748	3.67
16. CHARLTON ST	WELLINGTON ST	WENTWORTH ST	55.0	3.59	2.51	1.43	.854	12835	3.83
17. BARTON ST	GAGE AV	OTTAWA ST	83.0	3.58	2.35	1.52	.860	19256	5.79
18. KING ST	WELLINGTON ST	WENTWORTH ST	106.0	3.53	2.27	1.56	.866	24800	7.51
19. UPPER JAMES	LIMERIDGE RD	MOHAWK RD	133.0	3.46	2.20	1.57	1.049	26199	9.61
20. BARTON ST	NASH RD	CENTENNIAL PKWY	108.0	3.35	2.25	1.49	.836	27530	8.05
21. MOUNTAIN									
BROW BL	MOHAWK RD	LIMERIDGE RD	25.0	3.31	2.82	1.17	1.220	4430	1.89
22. YORK BL	QUEEN ST	JAMES ST	57.0	3.21	2.45	1.31	.921	13784	4.44
23. GAGE AV	LAWRENCE RD	KING ST	25.0	3.06	2.79	1.10	.982	5938	2.04
24. KENILWORTH AV	KENILWORTH ACCESS	MAIN ST	59.0	3.03	2.42	1.25	.695	19991	4.86
25. MAIN ST	JAMES ST	WELLINGTON ST	97.0	2.94	2.24	1.31	.866	27208	8.24
ALL CITY OF HAMILTON ARTERIAL STREETS				1.58					

(a) Please refer to Notes on page 78.

1991 COLLISION STATISTICS – SELECTED CANADIAN CITIES

CITY OR REGIONAL MUNICIPALITY	POPULATION	PROPERTY DAMAGE ONLY COLLISION REPORTING LEVEL	COLLISION REPORTING CRITERIA (1)				TOTAL COLLISIONS	COLLISIONS /1000		INJURY COLLISIONS /1000		
			(a)	(b)	(c)	(d)		Other	POPULATION	COLLISIONS	POPULATION	COLLISIONS
CITIES												
HAMILTON	311,791	700	N	N	Y	Y	f	4,900	15.7	1,846	5.9	
BURLINGTON	129,500	700	Y	Y	Y	Y	e, f	1,593	12.3	570	4.4	
CALGARY	708,593	1000	N	N	N	Y	e, f	31,958	45.1	3,746	5.3	
EDMONTON	614,665	1000	N	N	N	Y		20,637	33.6	4,304	7.0	
GUELPH	87,000	700	Y	Y	Y	Y	e, f	1,334	15.3	398	4.6	
HALIFAX	114,455	500	Y	Y	Y	Y		4,582	40.0	563	4.9	
LONDON	300,000	700	Y	Y	Y	Y		7,810	26.0	2,099	7.0	
MONTREAL	1,056,000	500	N	N	N	Y	g	28,464	27.0	5,405	5.1	
REGINA (2)	179,178	500	N	N	N	Y	f	6,095	34.0	1,404	7.8	
ST. CATHARINES	124,689 (1991)	700	Y	Y	Y	Y	f	2,932	23.5	N/A	N/A	
SASKATOON	180,794	500	N	N	N	Y		8,306	45.9	1,440	8.0	
METRO TORONTO (3)	2,133,559	700	Y	Y	Y	Y	e, f	53,029	24.9	18,624	8.7	
VANCOUVER	471,844 (1991)	400	Y	Y	Y	Y	f	39,284	83.3	6,981	14.8	
WINDSOR	191,000 (1992)	1000	Y	Y	Y	Y		6,375	33.4	1,710	9.0	
WINNIPEG	630,436	500	Y	Y	Y	Y		20,866	33.1	6,256	9.9	





1991 Hamilton-Wentworth Collision Report

CITY OR REGIONAL MUNICIPALITY	POPULATION	PROPERTY DAMAGE ONLY COLLISION REPORTING LEVEL	COLLISION REPORTING CRITERIA (1)				TOTAL COLLISIONS	COLLISIONS		INJURY			
			(a)	(b)	(c)	(d)		/1000	POPULATION	COLLISIONS	/1000	POPULATION	
													Other
REGIONS													
REGIONAL HAMILTON- WENTWORTH (4)	436,546	\$700	N	N	Y	Y	f	6,145	14.1	2,331	5.3		
REGION OF HALTON	303,200	700	N	N	Y	Y		4,722	15.6	894	2.9		
REGIONAL OTTAWA-CARLTON	678,147	700	Y	Y	Y	Y	f	15,530	22.9	4,272	6.3		
REGIONAL WATERLOO	389,817	700	Y	Y	Y	Y	f	9,471	24.3	1,421	3.7		

(1) KEY TO CRITERIA FOR REPORTING COLLISIONS (See next page for definitions of injury collisions)

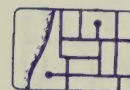
It is generally assumed, unless otherwise noted, that only collisions occurring on public roadways involving personal injury or property damage greater than the reporting level are included on this table.

- (a) Collisions reported involving an infraction of the Provincial Highway Traffic Act with property damage only and less than reporting level.
- (b) Collisions reported involving an infraction of the Criminal Code of Canada with property damage only and less than reporting level.
- (c) Hit and run collisions reported with property damage only and less than reporting level.
- (d) Collisions reported if it involves any personal injury.
- (e) Public property damage collisions.
- (f) Collisions involving City or Regional government vehicles.

(2) Only injuries requiring medical attention were classified as injury collisions.

(3) Injury collisions do not include fatal accidents.

(4) Not including Kings Highways.



DEFINITIONS OF "PERSONAL INJURY" (a)

Regional Hamilton-Wentworth	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
City of Hamilton	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Burlington	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Calgary	-	any type of injury resulting from a collision.
Edmonton	-	including minor abrasions and bruises, complaint of pain, caused by a motor vehicle collision.
Guelph	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
Halifax	-	injury or death (no stipulation regarding severity of injury) caused by a motor vehicle collision.
Region of Halton	-	any bodily harm, visible or complained of, that results from a motor vehicle collision.
London	-	any type of injury, visible or complained of, caused by a collision; need not be treated at a hospital.
Montreal	-	any injury, apparent or not, to any person, caused directly or indirectly, by a motor vehicle.
Regional Ottawa-Carleton	-	injury is any bodily harm visible or complaint of, caused by a motor vehicle collision.
Regina	-	any bodily harm, visible or complaint of, caused by the accident.
	-	any bodily harm, visible or complaint of, caused by the accident.
Metro Toronto	-	injury must be reported when an injury occurs to any of the involved persons in a collision.
Regional Waterloo	-	injury or death (no stipulation regarding severity of injury) caused by a motor vehicle collision.
Windsor	-	any injury resulting from a motor vehicle collision.
Winnipeg	-	readily identifiable injury or perceived injury caused by a collision.

(a) Definitions of a "personal injury" such that a collision involving a personal injury must be reported.



Exhibit 6.8

FATAL COLLISION STATISTICS (a)**CANADIAN CITIES**

CITY	FATALITIES 1989	RATE PER 100,000 POPULATION	RATE PER 10,000 REGISTERED VEHICLES
Montreal	68	5.6	1.7
Hamilton (b)	19	6.4	1.1
Vancouver	39	9.5	1.6
Medicine Hat	3	12.0	2.6
Lethbridge	7	19.1	4.1

NORTH AMERICAN CITIES

(Population 350,000 – 500,000)

CITY	FATALITIES 1989	RATE PER 100,000 POPULATION	RATE PER 10,000 REGISTERED VEHICLES
Buffalo, N.Y.	18	5.0	0.6
Minneapolis, Minn.	21	5.9	0.8
Hamilton, ON (b)	19	6.4	1.1
Omaha, Neb.	24	6.5	0.8
Seattle, Wash.	34	7.0	0.7
Pittsburgh, Pa.	32	7.5	1.3
Cincinnati, Ohio	33	8.3	1.2
Denver, Colo.	49	10.3	1.1
Toledo, Ohio	45	12.8	1.6
Kansas City, Mo.	81	17.7	2.3
Atlanta, Ga.	88	21.7	2.6
Nashville, Tenn.	93	21.9	3.5
Oklahoma City, Okla.	82	22.4	3.2
Fort Worth, Tex.	83	22.6	2.8

OUT OF THE 14 NORTH AMERICAN CITIES REPORTING, THAT HAVE SIMILAR POPULATIONS, HAMILTON HAS THE THIRD LOWEST RATE OF FATAL COLLISIONS BASED ON POPULATION AND THE FIFTH LOWEST RATE OF FATAL COLLISIONS BASED ON VEHICLE REGISTRATION.

(a) SOURCE: Accident Facts, 1990 Edition,

National Safety Council, 444 N. Michigan Avenue, Chicago, Ill.

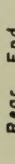
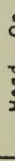
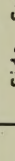
(b) Rate is for City of Hamilton only.

Appendix

APPENDIX A.1

INITIAL IMPACT TYPES AS DESCRIBED IN EXHIBIT 2.6

FIELD #45 MOTOR VEHICLE COLLISION REPORTING SYSTEM

Initial Impact Type Diagram	Rear End	Head On	Side Swipe	Side Swipe	Overtaking	Right Turn
						
Code Value	21	22	23	24	25	26
Short Name #	REAREND	HEADON	SDSWPOP	SDSWPSM	OVERTAK	RTRREND

27	28	31	32	33
RTONCOM	LTONCOM	RTANGLE	RTSDSWP	THR/RT

34	35	36	37	38	39
LTSDSWP	THR/LT	SMVPARK	SMVOTHR	VEH/PED	LTRTSWP
					OTHER

INITIAL IMPACT TYPES AS DESCRIBED IN EXHIBIT 2.0

Collision	Diagram	Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
24		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
25		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5

Collision	Diagram	Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
26		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
27		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5

Collision	Diagram	Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
28		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
29		Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5

APPENDIX A1

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